

SERIES
**CHALLENGE
CHALLENGE - E
CHALLENGE - ES**



THERMOSTATIC AND CLIMATIC CHAMBERS



Installation, use and maintenance handbook

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DICHIARAZIONE DI CONFORMITÀ
DECLARATION OF CONFORMITY



Denominazione prodotto
Product Name **CHALLENGE**

Ordine / Serie N.
Order/series N°

Costruttore
Manufacturer



Mandatario
Agent



La macchina è conforme ai dettami delle seguenti Direttive CEE:

- Direttiva Macchine n° 98/37, successive modifiche e DPR 459/96.
- Direttiva Bassa Tensione n° 73/23 e successive modifiche.
- Direttiva Compatibilità Elettromagnetica n° 89/336 e successive modifiche.

The machine complies with the regulations in the following EEC Directives:

- *Machinery Directive n° 98/37, subsequent modifications and DPR 459/96.*
- *Low Voltage Directive n° 73/23 and subsequent modifications.*
- *Electromagnetic Compatibility Directive n° 89/336 and subsequent modifications.*

In particolare soddisfa le seguenti Norme Armonizzate:

- EN 292-1 Sicurezza del macchinario - Concetti fondamentali, principi generali di progettazione - Parte 1: Terminologia, metodologia di base. 1991.
- EN 292-2 Sicurezza del macchinario - Concetti fondamentali, principi generali di progettazione - Parte 2: Specifiche e principi tecnici. 1991.
- EN 294 Sicurezza del macchinario - Distanza di sicurezza per impedire il raggiungimento di zone pericolose con gli arti superiori. 1992
- EN 61326-1 Apparecchi elettrici di misura, controllo e laboratori. Prescrizioni di compatibilità elettromagnetica. - Parte 1: Prescrizioni generali e successive modifiche.
- EN 61010-1 Prescrizioni di sicurezza per apparecchi elettrici di misura, controllo e per utilizzo in laboratorio - Parte 1: Prescrizioni generali.

In particular it complies with the following Standardized Norms:

- *EN292-1 Safety of machinery - Fundamental concepts, general principles for design - Part 1: Terminology, basic methodology, 1991.*
- *EN292-2 Safety of machinery - Fundamental concepts, general principles for design - Part 2: Technical specifications and principles. 1991.*
- *EN294 Safety of machinery - Safety distance to prevent upper limbs coming into contact with dangerous areas. 1992.*
- *EN61326-1 - Electrical equipment for measurement, control and laboratory use EMC requirements - Part. 1 - General requirements.*
- *EN61010-1 Safety instructions for electrical apparatus to measure, and control and for laboratory use - Part 1: General instructions.*

Data _____
Date

L'amministratore delegato
Managing Director

Gianluigi Angelantoni

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1 SUMMARY OF RATING PLATE DATA

- Find the special rating plate on the machine in order to check the technical data.
- Check the machine model and supply voltage before carrying out any operation whatsoever.
- If you find any discrepancies, contact the manufacturer or your supplier immediately.

The diagram shows a rating plate for ACS environmental chambers. The plate is divided into several sections with labels pointing to specific fields:

- Manufacturer's address:** Angelantoni Industrie S.p.A., environmental chamber division, massa martana (pg) Italy.
- Model:** ACS
- Type:** [Blank field]
- Series N°:** Serial No. [Blank field]
- Min-max temperature:** °C [Blank field]
- Supply voltage:** V [Blank field]
- EC compliance symbol:** CE
- Maximum electrical absorption:** A [Blank field]
- Weight:** Weight kg [Blank field]
- Year of manufacture:** Year [Blank field]
- Min-max relative humidity:** % [Blank field]
- Absorbed power:** kW [Blank field]
- Compressor power:** HP [Blank field]
- Type of cooling gas:** Gas [Blank field]
- Gas properties:** Gas 1 [Blank field], Gas 2 [Blank field]
- Bar:** Bar [Blank field], Bar [Blank field]
- Type of cooling gas 1:** [Blank field]
- Type of cooling gas 2:** [Blank field]
- Pressure of cooling gas 1:** [Blank field]
- Pressure of cooling gas 2:** [Blank field]

A dashed line separates the main technical data from the gas properties section. A note "Only for some countries" is present next to the Bar fields.

2 WARNINGS

2.1 GENERAL WARNINGS

- Do not carry out any operations or manoeuvres unless you are absolutely certain of their effect; if in doubt, contact your nearest technical assistance service or the manufacturer himself.
- The manufacturer will not be held responsible for damage to the machine or to objects in the following cases:
 - improper use of the machine
 - use of unsuitable personnel
 - incorrect assembly and installation
 - defects in the plant systems
 - unauthorized modifications or operations to the machine
 - use of spare parts that are not original pieces
 - failure to comply with the norms given in this handbook
 - exceptional events
- This instruction handbook has been designed for the following personnel:
 - Personnel in charge of transport, handling and removal of packaging
 - Personnel in charge of the preparation of the plant systems and installation site
 - Installers
 - Personnel in charge of using the machine
 - Personnel in charge of maintenance
- The instruction handbook indicates the use foreseen by the manufacturer and cannot ever replace adequate experience of the operator. It can only be used as a reminder of the main operations to be carried out.
- The instruction handbook should be kept carefully and should also be within easy reach for reference. If necessary, photocopy the pages concerned directly with machine use. The handbook should last at least the life-time of the machine itself.

- The instruction handbook gives technical information on how the machine is manufactured at the present time; the manufacturer reserves the right to carry out any modifications he deems necessary to the machines and to the instruction handbooks, without prior notice or replacement.

This handbook should last at least as long as the machine itself.

It is, therefore, a good idea to protect it against damages.

If you lose or destroy the handbook, you may ask for a copy. Please give the rating plate data (see chap. 1) in your request.



2.2 WARNINGS FOR TRANSPORT AND HANDLING

- This symbol, placed on each packaging, indicates the weight of each package.
- Always check that the tools and machines to handle and transport the machine are adequate.
- Always keep the machine in an upright position. If the machine should accidentally turn upside-down or on its side, do not switch it on. Put it in the correct position and contact the manufacturer.

2.3 WARNINGS FOR INSTALLATION

- Installation should always be carried out by specialized personnel.
- Carefully follow the instructions on how to prepare the plant systems before installing the machine.
- When the installation site is being prepared, bear in mind the space and work conditions of the personnel in charge of the machine so as to reduce to a minimum noise, fatigue, discomfort and anything else which may have a negative influence on the staff.
- When designing the installation site, remember to leave sufficient space for control, maintenance, cleaning, and removal of production waste material.
- Make sure there are clear notices near the machine to warn personnel who are not in charge of the dangers withing the work range of the machine during the work cycle.
- Make sure that the work site is adequately lit so that personnel can work in optimum conditions.
- When designing the installation site, please refer to the norms in force and in particular:
 - set up all the firefighting and safety devices.

2.4 WARNINGS FOR PERSONNEL IN CHARGE OF THE MACHINE

- After a pause of over 48 hours in the work cycle, always heat the compressor oil before carrying out any work (see paragraph 8.1).
- The machine may only be used by personnel who have read the rules described in this handbook.
- If the chamber is opened in temperatures that differ greatly from ambient temperatures, problems could be created: if the internal temperature is high, it will be very difficult to close the door because of expansion; if the internal temperature is very low, phenomena of condensate and frosting due to ambient humidity could occur. If the door is opened frequently in these conditions, it is not only dangerous but could cause damage to the gaskets of the door and could obstruct the heat exchangers.



Very important!
In order to guarantee the standard of safety for the products to be tested and for the machine, always set the software and hardware temperature alarms (paragraph 8.2).

2.5 WARNINGS FOR MAINTENANCE

- Always disconnect the machine from the hydraulic and electrical mains supply before carrying out any maintenance operation whatsoever.
- Always close all the stop valves above the machine.
- Do not use solvents or alcohol to clean the varnished parts as these products could damage the surface.

2.6 EXPLANATION OF SYMBOLS

- The symbols shown below may be found on the machine or in this instruction handbook.
- Pay attention to their meaning before going any further.



USE GLOVES



GENERAL DANGER
This symbol is always accompanied by an explanation of the danger



WARNING!
Important note



Operations that must be carried out by at least two people.

3 TECHNICAL SPECIFICATIONS

3.1 TECHNICAL DATA FOR CLIMATIC CHAMBERS

The climatic chambers carry out tests by controlling temperature and relative humidity

CHALLENGE SERIE MOD.	CH250	CH340	CH600	CH1200	CH1600	CH2000
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-40 +180	-40 +180	-40 +180	-40 +180	-40 +180	-40 +180
Accuracy (\pm °C)	0,25 \div 0,3	0,25 \div 0,3	0,25 \div 0,3	0,25 \div 0,3	0,25 \div 0,3	0,25 \div 0,3
Humidity range (with temperature from +5 to +95°C)	10 \div 98%	10 \div 98%	10 \div 98%	10 \div 98%	10 \div 98%	10 \div 98%
RH accuracy (no less than +/-0,25°C on psychometric difference)	1% \div 3%	1% \div 3%	1% \div 3%	1% \div 3%	1% \div 3%	1% \div 3%
Dew point range for continuous tests (°C)	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C
Dew point range for discontinuous tests (°C)	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C
Supply voltage ⁽³⁾ (V)	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G
Max electrical absorption ⁽³⁾ (A)	14	14	20,5	26,3	26,3	26,3
Rated output ⁽³⁾ (kW)	4,8	4,8	6,8	8,7	8,7	8,7
Max. used power ⁽³⁾ (kW)	7,7	7,7	11,4	14,6	14,6	14,6
Maximum internal temperature load (W)	400 (-25 °C)	400 (-25 °C)	1000 (-25 °C)	1300 (-25 °C)	1300 (-25 °C)	500 (-25 °C)
Cooling gas	R404 A	R404 A	R404 A	R404 A	R404 A	R404 A
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460 x1516 (h ₁ = 47)	850x1725x1516 (h ₁ = 47)	1100x1705x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535x700	600x800x700	850x733x895	1000x1130 x1020	1000x1505x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	530	600	800	1060	1370	1470
Overall weight without packaging (kg)	490	550	750	990	1300	1400
Floor load (kg/m ²)	400	375	400	367	410	369
Noise level with air condenser (dB A)	59	59	64	65	65	65
Air condenser	x	x	x	x	x	x
Water condenser	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾

⁽¹⁾ Standard packaging is made of cardboard or plastic, suitable for transport by road or air freight.
For sea freight please contact the manufacturer or his agent to request all the relevant information.

⁽²⁾ Under request when purchasing

⁽³⁾ In case of special power supply please see enclosed manual.

CHALLENGE SERIE MOD.	CH250 C	CH340 C	CH600 C	CH1200 C	CH1600 C	CH2000 C
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-75 +180	-75 +180	-75 +180	-75 +180	-75 +180	-75 +180
Accuracy (± °C)	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3
Humidity range (with temperature from +5 to +95°C)	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%
RH accuracy (no less than +/-0,25°C on psychrometric difference)	1% ÷ 3%	1% ÷ 3%	1% ÷ 3%	1% ÷ 3%	1% ÷ 3%	1% ÷ 3%
Dew point range for continuous tests (°C)	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C
Dew point range for discontinuous tests (°C)	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C
Supply voltage ⁽³⁾ (V)	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G
Max electrical absorption ⁽³⁾ (A)	16,5	16,5	25,9	32,3	32,3	32,3
Rated output ⁽³⁾ (kW)	5,7	5,7	8,6	10,7	10,7	10,7
Max. used power ⁽³⁾ (kW)	9	9	14,4	17,9	17,9	17,9
Maximum internal temperature load (W)	600 (-55 °C)	500 (-55 °C)	1200 (-55 °C)	1500 (-55 °C)	1500 (-55 °C)	550 (-55 °C)
Cooling gas	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460 x1516 (h ₁ = 47)	850x1725x1516 (h ₁ = 47)	1100x1705x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535 x700	600x800x700	850x733x895	1000x1130x1020	1000x1505x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	580	650	880	1160	1470	1570
Overall weight without packaging (kg)	540	600	830	1090	1400	1500
Floor load (kg/m ²)	435	410	445	405	441	395
Noise level with air condenser (dB A)	63	63	66	68	68	68
Air condenser	x	x	x	x	x	x
Water condenser	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾

⁽¹⁾ Standard packaging is made of cardboard or plastic, suitable for transport by road or air freight.
For sea freight please contact the manufacturer or his agent to request all the relevant information.

⁽²⁾ Under request when purchasing

⁽³⁾ In case of special power supply please see enclosed manual.

CHALLENGE ES SERIE MOD.	CH250 ES	CH340 ES	CH600 ES	CH1200 ES	CH1600 ES	CH2000 ES
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-40 +180	-40 +180	-40 +180	-40 +180	-40 +180	-40 +180
Accuracy (± °C)	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1
Humidity range (with temperature from +5 to +95°C)	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%
RH accuracy (no less than +/-0,25°C on psychometric difference)	±5%	±5%	±5%	±5%	±5%	±5%
Dew point range for continuous tests (°C)	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C
Dew point range for discontinuous tests (°C)	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C
Supply voltage ⁽³⁾ (V)	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G
Max electrical absorption ⁽³⁾ (A)	22	22	24	32,5	32,5	-
Rated output ⁽³⁾ (kW)	7	7	7,5	10,1	10,1	-
Max. used power ⁽³⁾ (kW)	12	12	13	17,9	17,9	-
Maximum internal temperature load (W)	1600 (-25°C)	1300 (-25°C)	2500 (-25°C)	3500 (-25°C)	2600 (-25°C)	-
Cooling gas	R404 A	R404 A	R404 A	R404 A	R404 A	R404 A
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460x1516 (h ₁ = 47)	850x1725x1516 (h ₁ = 47)	1100x1705x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535x700	600x800x700	850x733x895	1000x1130x1020	1000x1505x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	590	660	870	1140	1470	-
Overall weight without packaging (kg)	550	610	820	1070	1400	-
Floor load (kg/m²)	443	416	465	396	440	-
Noise level with air condenser (dB A)	60	60	66	67	67	-
Air condenser	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾
Water condenser	x	x	x	x	x	x

⁽¹⁾ Standard packaging is made of cardboard or plastic, suitable for transport by road or air freight.
For sea freight please contact the manufacturer or his agent to request all the relevant information.

⁽²⁾ Under request when purchasing, only special production.

⁽³⁾ In case of special power supply please see enclosed manual.

CHALLENGE ES SERIE MOD.	CH250 C ES	CH340 C ES	CH600 C ES	CH1200 C ES	CH1600 C ES	CH2000 C ES
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-75 +180	-75 +180	-75 +180	-75 +180	-75 +180	-75 +180
Accuracy (± °C)	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1
Humidity range (with temperature from +5 to +95°C)	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%	10 ÷ 98%
RH accuracy (no less than +/-0,25°C on psychometric difference)	±5%	±5%	±5%	±5%	±5%	±5%
Dew point range for continuous tests (°C)	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C	+2 +94 °C
Dew point range for discontinuous tests (°C)	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C	-20 +2°C
Supply voltage ⁽³⁾ (V)	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G
Max electrical absorption ⁽³⁾ (A)	27	27	29	43	43	-
Rated output ⁽³⁾ (kW)	8,5	8,5	9,5	13,3	13,3	-
Max. used power ⁽³⁾ (kW)	15	15	15,8	23,8	23,8	-
Maximum internal temperature load (W)	2000 (-55°C)	1500 (-55°C)	3500 (-55°C)	4500 (-55°C)	4000 (-55°C)	-
Cooling gas	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460x1516 (h ₁ = 47)	850x1725x1516 (h ₁ = 47)	1100x1705x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535x700	600x800x700	850x733x895	1000x1130x1020	1000x1505x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	670	740	990	1300	1570	-
Overall weight without packaging (kg)	630	690	940	1230	1500	-
Floor load (kg/m ²)	529	470	501	455	481	-
Noise level with air condenser (dB A)	65	65	68	70	70	60
Air condenser	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾
Water condenser	x	x	x	x	x	x

⁽¹⁾ Standard packaging is made of cardboard or plastic, suitable for transport by road or air freight. For sea freight please contact the manufacturer or his agent to request all the relevant information.

⁽²⁾ Under request when purchasing, only special production.

⁽³⁾ In case of special power supply please see enclosed manual.

CHALLENGE SERIE MOD. E	CH250 E	CH340 E	CH600 E	CH1200 E	CH1600 E	CH2000 E
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-20 +180	-20 +180	-20 +180	-10 +150	-10 +150	-10 +150
Accuracy (± °C)	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3
Humidity range (with temperature from +5 to +95°C)	10 ÷ 95%	10 ÷ 95%	10 ÷ 95%	10 ÷ 95%	10 ÷ 95%	10 ÷ 95%
RH accuracy (no less than +/-0,25°C on psychometric difference)	1% ÷ 3%	1% ÷ 3%	1% ÷ 3%	1% ÷ 3%	1% ÷ 3%	1% ÷ 3%
Dew point range for continuous tests (°C)	+2 +84 °C	+2 +84 °C	+2 +84 °C	+2 +84 °C	+2 +84 °C	+2 +84 °C
Supply voltage ⁽³⁾ (V)	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G
Max electrical absorption ⁽³⁾ (A)	7,4	7,4	7,4	8,3	8,3	8,3
Rated output ⁽³⁾ (kW)	2,4	2,4	2,4	2,7	2,7	2,7
Max. used power ⁽³⁾ (kW)	4,1	4,1	4,1	4,6	4,6	4,6
Maximum internal temperature load (W)	500 (0 °C)	500 (0 °C)	500 (0 °C)	500 (0 °C)	500 (0 °C)	500 (0 °C)
Cooling gas	R404 A	R404 A	R404 A	R404 A	R404 A	R404 A
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460x1516 (h ₁ = 47)	850x1725x1516 (h ₁ = 47)	1100x1705 x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534 x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535x700	600x800x700	850x733 x895	1000x1130x1020	1000x1505x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	500	560	770	1030	1070	1170
Overall weight without packaging (kg)	460	520	720	960	1000	1100
Floor load (kg/m ²)	371	379	384	356	315	290
Noise level with air condenser (dB A)	59	59	59	59	59	59
Air condenser	x	x	x	x	x	x
Water condenser	(²)	(²)	(²)	(²)	(²)	(²)

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(²) Under request when purchasing

(³) In case of special power supply please see enclosed manual.

3.2 TECHNICAL DATA FOR THERMOSTATIC CHAMBERS

The thermostatic chambers carry out tests only by controlling temperature

CHALLENGE SERIE MOD.	CH250 T	CH340 T	CH600 T	CH1200 T	CH1600 T	CH2000 T
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-40 +180	-40 +180	-40 +180	-40 +180	-40 +180	-40 +180
Accuracy (± °C)	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3
Supply voltage ⁽³⁾ (V)	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G
Max electrical absorption ⁽³⁾ (A)	10,2	10,2	18,4	22,1	22,1	22,1
Rated output ⁽³⁾ (kW)	3,4	3,4	6,1	7,3	7,3	7,3
Max. used power ⁽³⁾ (kW)	5,7	5,7	10,2	12,2	12,2	12,2
Maximum internal temperature load (W)	400 (-25 °C)	400 (-25 °C)	1000 (-25 °C)	1300 (-25 °C)	1300 (-25 °C)	500 (-25 °C)
Cooling gas	R404 A	R404 A	R404 A	R404 A	R404 A	R404 A
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460 x1516 (h ₁ = 47)	850x1725 x1516 (h ₁ = 47)	1100x1705x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535x700	600x800x700	850x733x895	1000x1130x1020	1000x1505x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	540	600	800	1060	1370	1470
Overall weight without packaging (kg)	490	550	750	990	1300	1400
Floor load (kg/m ²)	395	376	400	367	410	369
Noise level with air condenser (dB A)	59	59	64	65	65	65
Air condenser	x	x	x	x	x	x
Water condenser	(²)	(²)	(²)	(²)	(²)	(²)

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CHALLENGE SERIE MOD.	CH250 TC	CH340 TC	CH600 TC	CH1200 TC	CH1600 TC	CH2000 TC
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-75 +180	-75 +180	-75 +180	-75 +180	-75 +180	-75 +180
Accuracy (± °C)	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3
Supply voltage ⁽³⁾ (V)	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G
Max electrical absorption ⁽³⁾ (A)	12,8	12,8	23,8	27,4	27,4	27,4
Rated output ⁽³⁾ (kW)	4,2	4,2	7,9	9,2	9,2	9,2
Max. used power ⁽³⁾ (kW)	7,1	7,1	13,2	15,4	15,4	15,4
Maximum internal temperature load (W)	600 (-55 °C)	500 (-55 °C)	1200 (-55 °C)	1500 (-55 °C)	1500 (-55 °C)	550 (-55 °C)
Cooling gas	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460x1516 (h ₁ = 47)	850x1725 x1516 (h ₁ = 47)	1100x1705x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535x700	600x800x700	850x733x895	1000x1130x1020	1000x1505x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	580	650	880	1160	1470	1570
Overall weight without packaging (kg)	540	600	830	1090	1400	1500
Floor load (kg/m ²)	435	409	445	405	441	395
Noise level with air condenser (dB A)	63	63	66	68	68	68
Air condenser	x	x	x	x	x	x
Water condenser	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾

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CHALLENGE ES SERIE MOD.	CH250T ES	CH340T ES	CH600T ES	CH1200T ES	CH1600T ES	CH2000T ES
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-40 +180	-40 +180	-40 +180	-40 +180	-40 +180	-40 +180
Accuracy (± °C)	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1
Supply voltage ⁽³⁾ (V)	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G
Max electrical absorption ⁽³⁾ (A)	18	18	20	28,5	28,5	-
Rated output ⁽³⁾ (kW)	5,5	5,5	6	9,3	9,3	-
Max. used power ⁽³⁾ (kW)	9,8	9,8	10,8	15,7	15,7	-
Maximum internal temperature load (W)	1600 (-25°C)	1300 (-25°C)	2500 (-25°C)	3500 (-25°C)	2600 (-25°C)	-
Cooling gas	R404 A	R404 A	R404 A	R404 A	R404 A	R404 A
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460x1516 (h ₁ = 47)	850x1725x1516 (h ₁ = 47)	1100x1705x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535x700	600x800x700	850x733x895	1000x1130x1020	1000x1505x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	590	660	870	1140	1470	-
Overall weight without packaging (kg)	550	610	820	1070	1400	-
Floor load (kg/m ²)	443	416	465	396	440	-
Noise level with air condenser (dB A)	60	60	66	67	67	-
Air condenser	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾
Water condenser	x	x	x	x	x	x

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CHALLENGE ES SERIE MOD.	CH250TC ES	CH340TC ES	CH600TC ES	CH1200TC ES	CH1600TC ES	CH2000TC ES
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-70 +180	-70 +180	-70 +180	-70 +180	-70 +180	-70 +180
Accuracy (± °C)	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1	0,5 ÷ 1
Supply voltage ⁽²⁾ (V)	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G	400 +6/-10% 50Hz 3+N+G
Max electrical absorption ⁽²⁾ (A)	23	23	25	39	39	-
Rated output ⁽²⁾ (kW)	7,3	7,3	7,9	12,6	12,6	-
Max. used power ⁽²⁾ (kW)	12,8	12,8	13,6	21,6	21,6	-
Maximum internal temperature load (W)	2000 (-55°C)	1500 (-55°C)	3500 (-55°C)	4500 (-55°C)	4000 (-55°C)	-
Cooling gas	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23	R404 A/R23
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460x1516 (h ₁ = 47)	850x1725x1516 (h ₁ = 47)	1100x1705x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535x700	600x800x700	850x733x895	1000x1130x1020	1000x1515x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	670	740	990	1300	1570	-
Overall weight without packaging (kg)	630	690	940	1230	1500	-
Floor load (kg/m ²)	529	470	501	455	481	-
Noise level with air condenser (dB A)	65	65	68	70	70	-
Air condenser	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾
Water condenser	x	x	x	x	x	x

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CHALLENGE SERIE MOD. E	CH250 TE	CH340 TE	CH600 TE	CH1200 TE	CH1600 TE	CH2000 TE
Useful volume (l)	224	336	557	1152	1535	2040
Temperature range (°C)	-20 +180	-20 +180	-20 +180	-10 +150	-10 +150	-10 +150
Accuracy (± °C)	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3	0,25 ÷ 0,3
Supply voltage ⁽³⁾ (V)	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G	230 +6/-10% 50Hz 1+G
Max electrical absorption ⁽³⁾ (A)	5,1	5,1	5,1	6,1	6,1	-
Rated output ⁽³⁾ (kW)	1,7	1,7	1,7	2,1	2,1	-
Max. used power ⁽³⁾ (kW)	2,8	2,8	2,8	3,4	3,4	-
Maximum internal temperature load (W)	500 (0 °C)	500 (0 °C)	500 (0 °C)	500 (0 °C)	500 (0 °C)	500 (0 °C)
Cooling gas	R404 A	R404 A	R404 A	R404 A	R404 A	R404 A
External dimensions (LxDxH) without wheels (with wheels H tot = H+ h ₁) (mm)	850x1460 x1516 (h ₁ = 47)	850x1725 x1516 (h ₁ = 47)	1100x1705 x1911 (h ₁ = 58)	1250x2160x2036 (h ₁ = 58)	1250x2534 x2040 (h ₁ = 70)	1250x3035x2040 (h ₁ = 70)
Useful internal dimensions (LxDxH) (mm)	600x535 x700	600x800x700	850x733 x895	1000x1130x1020	1000x1505x1020	1000x2000x1020
Maximum weight to be loaded on each internal shelf (kg)	50	50	50	50	50	50
Overall weight with standard packaging ⁽¹⁾ (kg)	510	560	800	1020	1220	-
Overall weight without packaging (kg)	460	520	720	950	1000	-
Floor load (kg/m ²)	469	355	400	351	362	-
Noise level with air condenser (dB A)	59	59	59	59	59	-
Air condenser	x	x	x	x	x	x
Water condenser	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾	⁽²⁾

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3.3 PERFORMANCE -gradients

Climatic chambers model	CH250	CH340	CH600	CH1200	CH1600	CH2000
Thermostatic chambers mod.	CH250 T	CH340 T	CH600T	CH1200 T	CH1600T	CH2000 T
Maximum temperature variation speed from -40°C to +180°C (°C/min)	3,9	3,9	3,2	3	2,3	2
Maximum temperature variation speed from +180°C to -40°C (°C/min)	2,5	1,5	2,5	2,5	2	1,5

Climatic chambers model	CH250 C	CH340 C	CH600 C	CH1200 C	CH1600 C	CH2000 C
Thermostatic chambers mod.	CH250 TC	CH340 TC	CH600 TC	CH1200 TC	CH1600TC	CH2000 TC
Maximum temperature variation speed from -70°C to +180°C (°C/min)	3,7	3,6	3,7	3	2,3	2
Maximum temperature variation speed from +180°C to -70°C (°C/min)	2	1,9	2	2	1,5	1

Temperature variation speed data are to be considered as mean values, measured at an ambient temperature of 20...22°C, without internal loads.

Climatic chambers model	CH250 E	CH340 E	CH600 E	CH1200 E	CH1600 E	CH2000 E
Thermostatic chambers mod.	CH250 TE	CH340 TE	CH600 TE	CH1200 TE	CH1600 TE	CH2000 TE
Maximum temperature variation speed from 0°C to +100°C (°C/min)	1,7	1,4	1	0,8	0,7	-
Maximum temperature variation speed from +100°C to 0°C (°C/min)	1,7	1,3	1	0,5	0,3	-

Climatic chambers model	CH250 ES	CH340 ES	CH600 ES	CH1200 ES	CH1600 ES	CH2000 ES
Thermostatic chambers mod.	CH250 T ES	CH340 T ES	CH600 T ES	CH1200 T ES	CH1600 T ES	CH2000 T ES
Maximum temperature variation speed from -25°C to +85°C (°C/min)	9,5	9,0	5,5	6,1	5,0	-
Maximum temperature variation speed from +85°C to -25°C (°C/min)	5,7	5,5	3,8	4,0	3,5	-
Maximum temperature variation speed from -40°C to +180°C (°C/min)	8,7	8,0	4,8	5,0	4,0	-
Maximum temperature variation speed from +180°C to -40°C (°C/min)	3,6	3,0	2,7	2,8	2,2	-

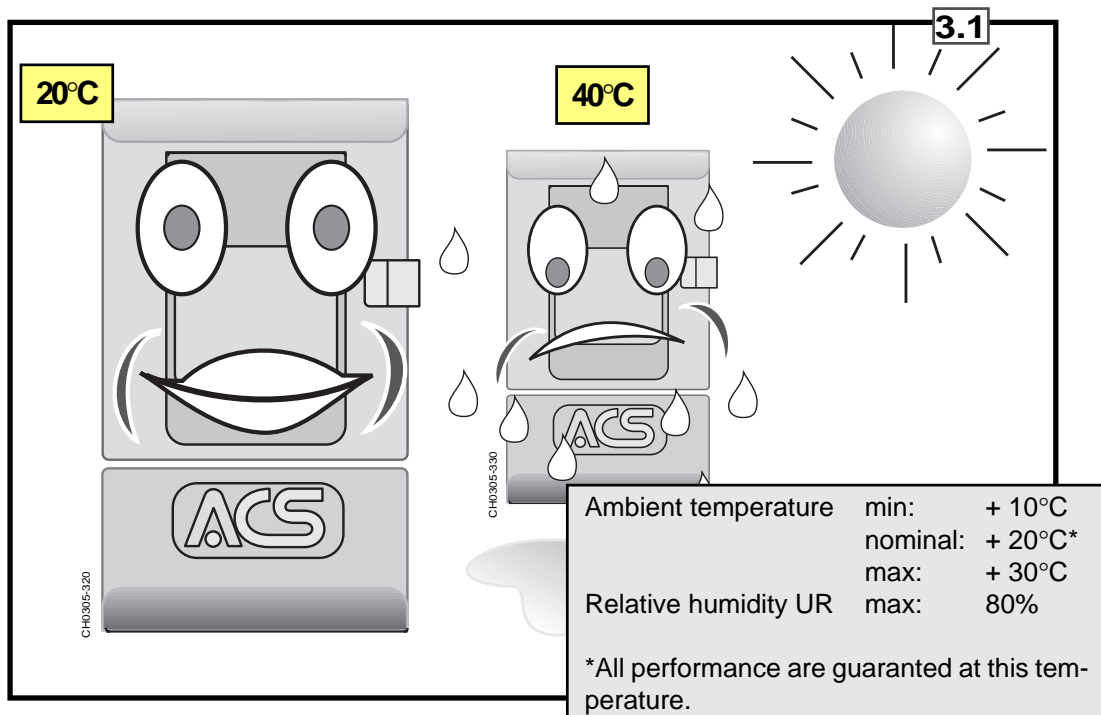
Climatic chambers model	CH250 C ES	CH340 C ES	CH600 C ES	CH1200 C ES	CH1600 C ES	CH2000 C ES
Thermostatic chambers mod.	CH250 TC ES	CH340 TC ES	CH600 TC ES	CH1200 TC ES	CH1600 TC ES	CH2000 TC ES
Maximum temperature variation speed from -55°C to +85°C (°C/min)	11,0	10	6,5	5,5	5,0	-
Maximum temperature variation speed from +85°C to -55°C (°C/min)	6,0	5,5	5,5	5,5	3,5	-
Maximum temperature variation speed from -70°C to +180°C (°C/min)	10,0	8	4,6	5,0	4,0	-
Maximum temperature variation speed from +180°C to -70°C (°C/min)	3,8	3	4,0	3,2	2,2	-

Temperature variation speed data are to be considered as mean values, measured at an ambient temperature of 20...22°C, without internal loads.

3.4 ENVIRONMENTAL CONDITIONS

In order for it to operate correctly, the chamber must be positioned as follows:

- far from heat sources;
- far from direct sunlight;
- far from air conditioning systems;
- in a dust-free ambient.



3.5 FUSES

Electrical initials		1F3	1F6	1F10	6F2	8F8
Model		Value/code ⁽³⁾				
CH250 T	CH250	25 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH340 T	CH340	25 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH600 T	CH600	25 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH1200 T	CH1200	25 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH1600 T	CH1600	25 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH2000 T	CH2000	32 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH250 TC	CH250 C	25 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH340 TC	CH340 C	25 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH600 TC	CH600 C	25 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH1200 TC	CH1200 C	50 A/14x51	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH1600 TC	CH1600 C	50 A/14x51	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH2000 TC	CH2000 C	50 A/14x51	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH250 TE	CH250 E	16 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	-	240 °C
CH340 TE	CH340 E	16 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	-	240 °C
CH600 TE	CH600 E	16 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	-	240 °C
CH1200 TE	CH1200 E	16 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	-	240 °C
CH1600 TE	CH1600 E	16 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	-	240 °C
CH2000 TE	CH2000 E	16 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	-	240 °C
CH250 T ES	CH250 ES	25 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH340 T ES	CH340 ES	32 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH600 T ES	CH600 ES	50 A/14x51	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH1200 T ES	CH1200 ES	50 A/14x51	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH1600 T ES	CH1600 ES	50 A/14x51	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH2000 T ES	CH2000 ES	-	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH250 TC ES	CH250 C ES	32 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH340 TC ES	CH340 C ES	32 A/CH10 10,3x38	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH600 TC ES	CH600 C ES	50 A/14x51	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH1200 TC ES	CH1200 C ES	63 A/14x51	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH1600 TC ES	CH1600 C ES	63 A/14x51	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C
CH2000 TC ES	CH2000 C ES	-	3 A/CH10 10,3x38	16 A/CH10 10,3x38	6 A/CH10 10,3x38	240 °C

⁽³⁾ In case of special power supply please see enclosed manual.

4 HANDLING AND REMOVAL OF PACKAGING

4.1 PERSONNEL REQUISITES

Personnel in charge of handling the machine need no special requisites (just remember the type of packaging).

However, we suggest that this is done by someone who is accustomed to using machines for lifting and transport operations.

4.2 MACHINE CONDITIONS

The machine is normally supplied packed and on a pallet. If the machine is delivered by our staff, it may be without packaging. Other types of packaging may be supplied according to the destination and/or customer's needs.

4.3 EQUIPMENT NEEDED FOR HANDLING

The machine can be raised and moved by a lift truck, bridge crane, crane or other suitable means with an adequate capacity.



Check that the forks are level and the load is stable before moving the machine.

In order to handle the machine, the following rules should be observed:

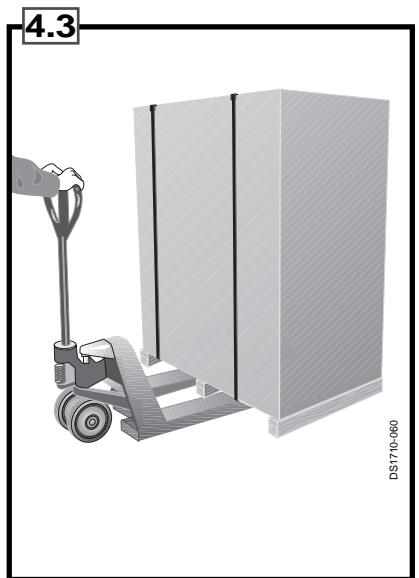
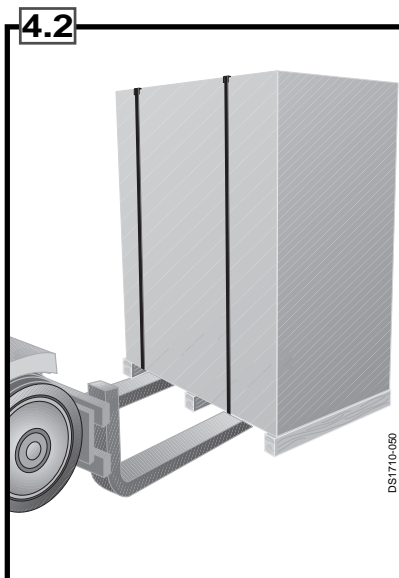
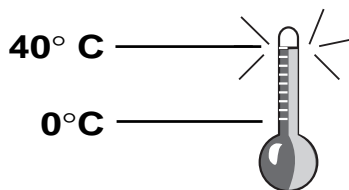
- Move the machine slowly
- Do not tilt the machine, always keep it in an upright position
- Always make sure you can control the machine during handling

Warning:

- Do not turn the machine upside-down
- Do not drag the machine
- Do not shake the machine

How to store the machine

It should be kept in a dry environment with an ambient temperature ranging from 0° ÷ 40° C.



Make sure that the forks do not hit the machine frame.

If it is hit accidentally, check immediately for any damage and if necessary, contact the manufacturer.

Do not place packaged machines one on top of the other and always keep them in an upright position as indicated by the special arrows marked on the packaging itself.

HOW TO RAISE AND MOVE WITH A BRIDGE CRANE

Accessories: textile fibre belts and PVC angle bars.

Weight: see technical specifications



Do not use place the machine in a sling of metal cables or chains as these could damage it.

Never put a sling around a machine without its pallet.

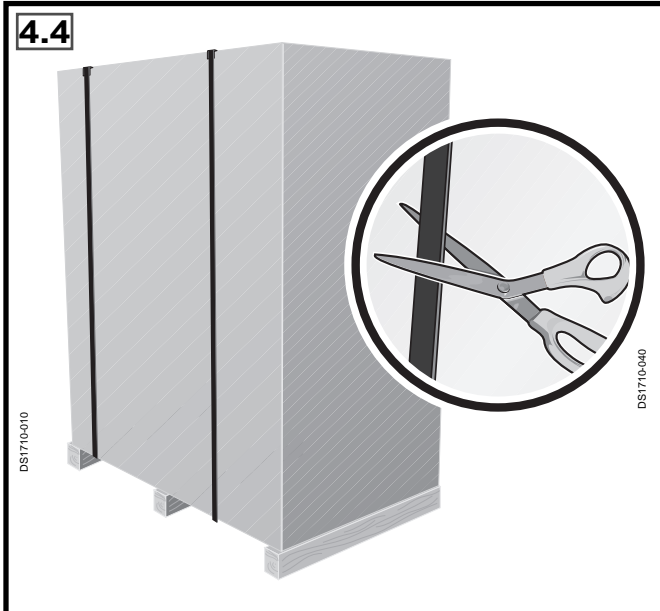
In order to prevent the oil in the compressor from flowing into the refrigerating circuit, only transport, stock and handle the equipment in an upright position according to the instructions on the packaging. If the machine is placed on its side, leave it in an upright position for at least 24 hours before switching on.

4.4 HOW TO REMOVE THE PACKAGING

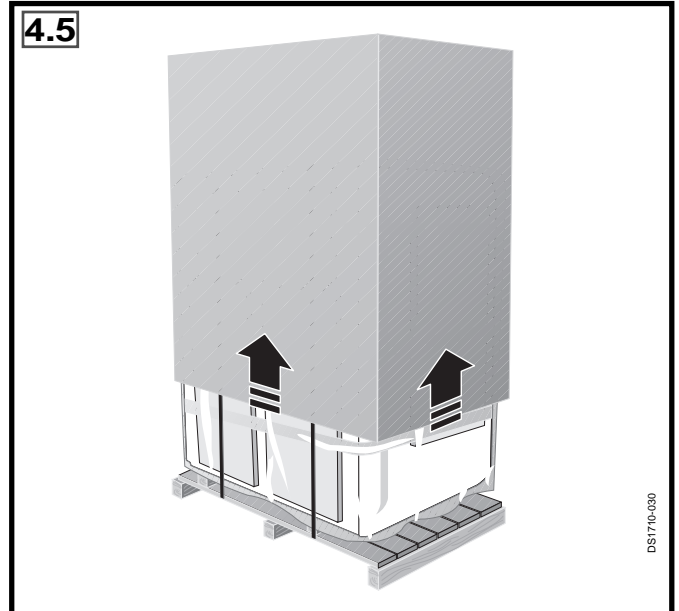


All the packaging materials can be recycled and can be disposed of according to the regulations in force. Take care to eliminate the packaging so that it does not become a danger and throw away the plastic bags, as they could cause children to suffocate.

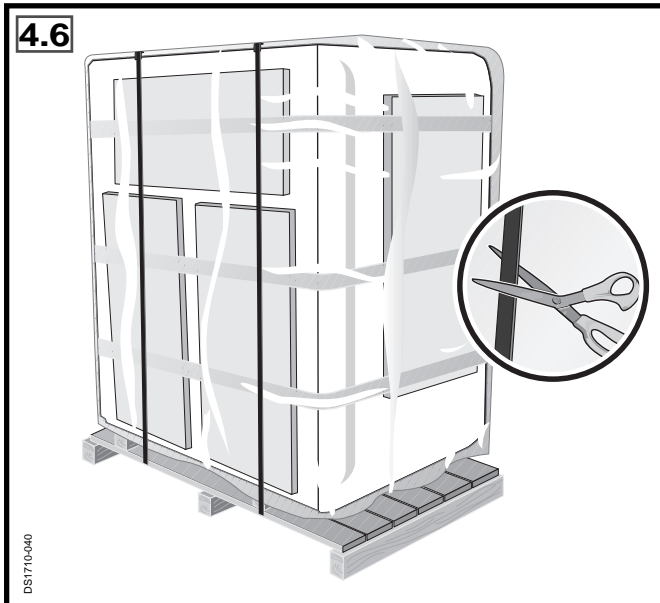
4.4.1 How to remove the outer straps



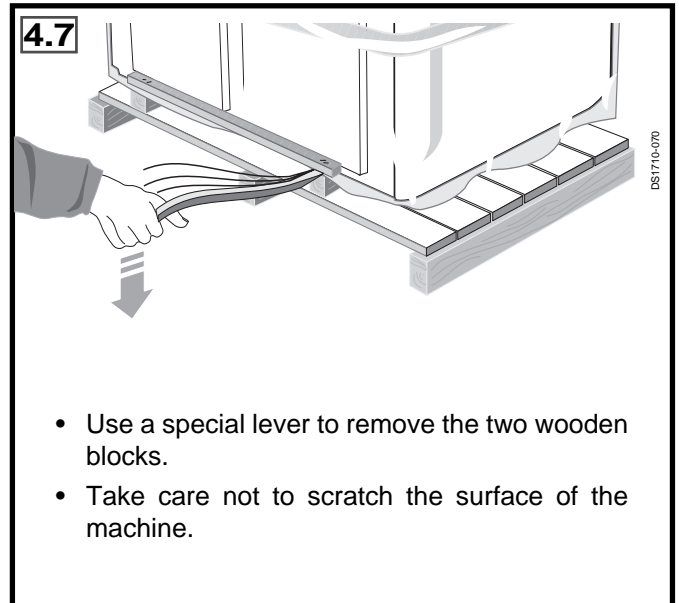
4.4.2 How to remove the cardboard casing



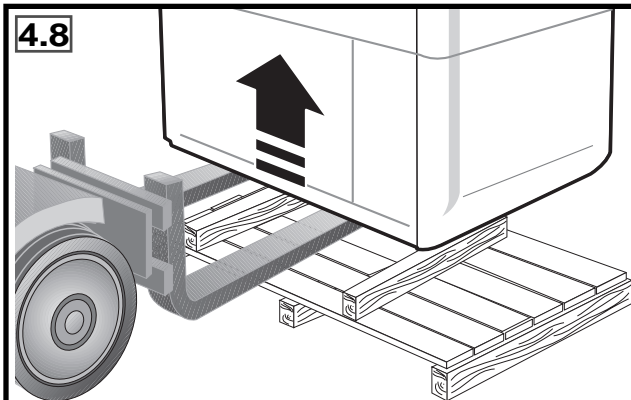
4.4.3 How to remove the internal straps



4.4.4 How to remove the wooden side blocks



4.4.5 How to remove the pallet



- Just raise the machine a few centimetres so that the pallet can be pulled out from underneath.
- The machine can be placed directly on the floor.



Do not bang or scratch the machine.

5 DESCRIPTION OF THE SYSTEM

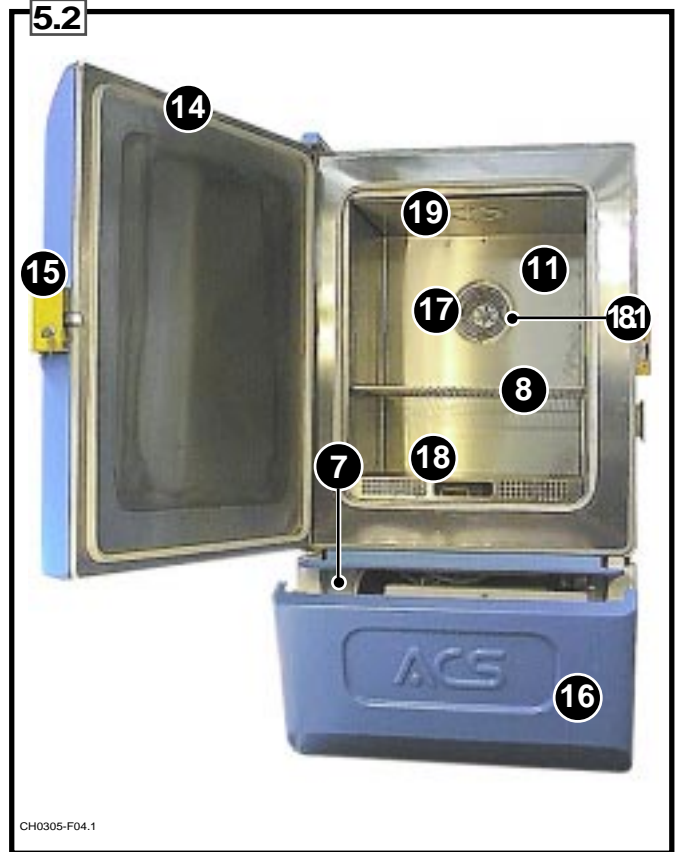
5.1 GENERAL VIEW



The inner chamber is made of stainless steel (AISI 304) and is welded to make it steamproof.

The external structure and the base of the chamber are made of epoxy-painted steel.

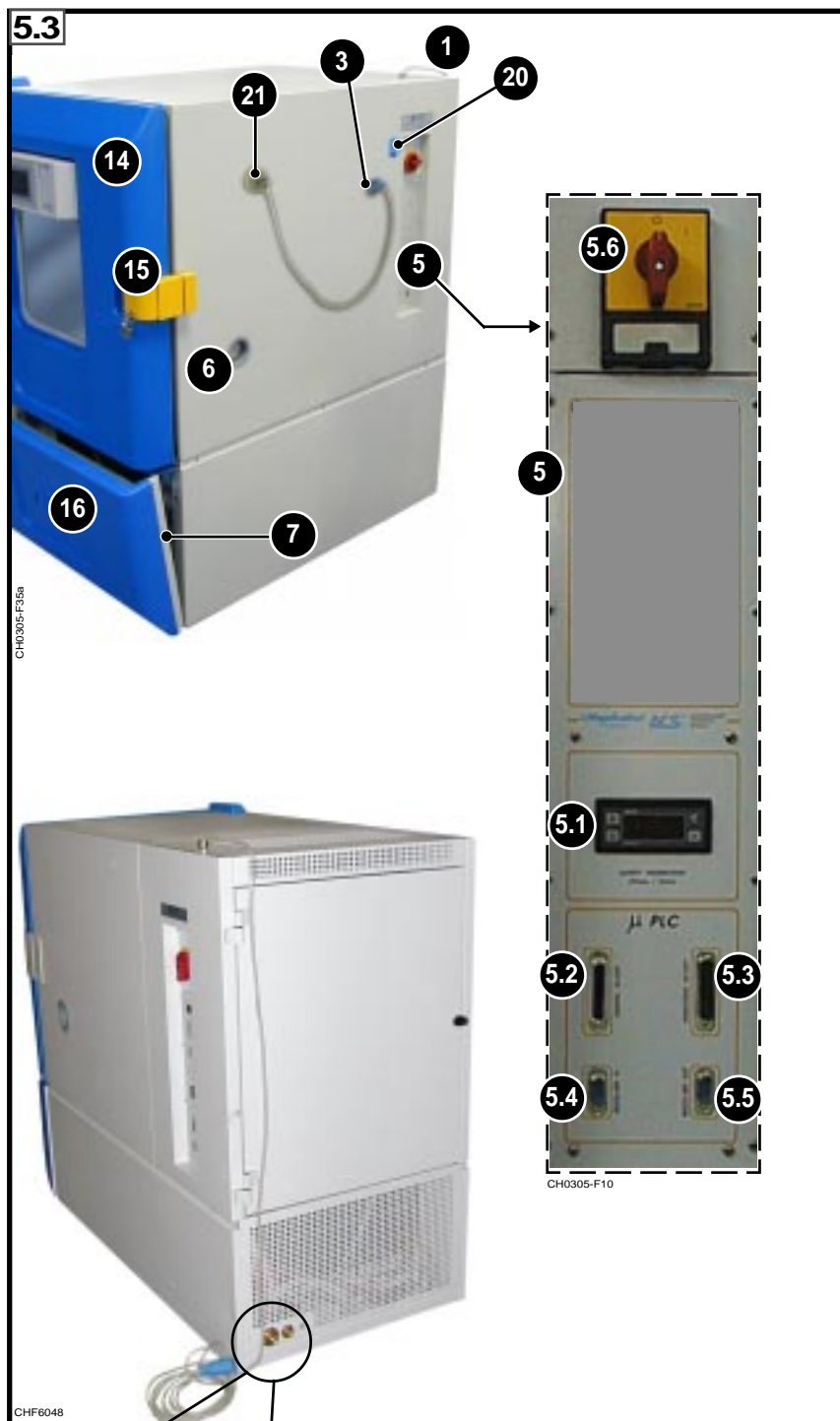
The chamber is insulated with special CFC-free polymerized polyurethane foam with a density of 40 kg/cu.m.



The door has a heated inspection hatch; the inner surface is made of stainless steel, the external surface is made of shockproof plastic.

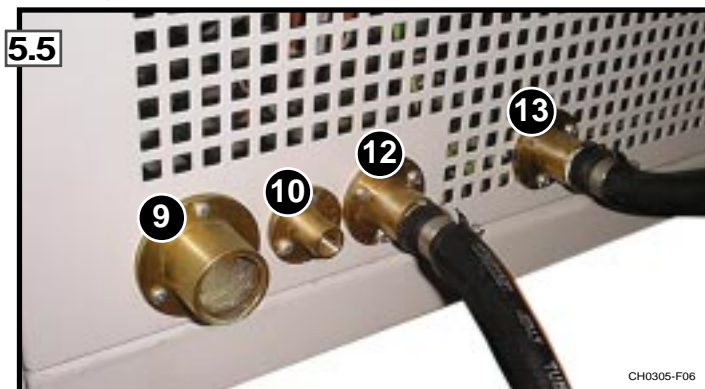
The chamber is lit by an incandescent lamp on the ceiling. Each chamber is equipped with an 80 mm port hole 6.

- 1 Supply cable
- 2 Inspection window (optional)
- 3 U.V. lamp socket (optional)
- 4 Control panel
- 5 Interface panel
- 5.1 Alarm signal electronic thermostat (fig. 8.3)
(stops the equipment when the temperature exceeds the preset limits)
- 5.2 DIGITAL IN/OUT connector (fig. 6.10)
connection of auxiliary contact digital input/output signals (enables customer's own operations)
- 5.3 ANALOGIC IN/OUT connector (fig. 6.11)
connection for analogic inputs (connection for user's auxiliary probes)
- 5.4 RS 232/485 IN connector (fig. 6.12)
RS 232 serial (RS 485 on request)
- 5.5 RS 232/485 OUT connector (fig. 6.13)
RS 232 serial (RS 485 on request)
- 5.6 Main switch (isolator switch)
- 6 Port hole
- 7 Demineralized water tank with inlet pipe
- 8 Internal shelf
- 9 Condensate drain
- 10 Humidification water inlet
- 11 Test room
- 12-13 Condensation water pipes
- 14 Chamber door
- 15 Handle with lock
- 16 Lower hatch door
- 17 Internal air recycling fan
- 18 Probes
- 18.1 Capacitive probe: only available on customer-built machines (*)
- 19 Internal lamp
- 20 10A Socket specimen power supply (optional)
- 21 Hole to house U.V. lamp.



Machines with air condenser

Machines with water condenser



(*) N.B.: If this probe is present, it will replace the wet bulb probe and therefore the psychrometric system and gauze no longer exist. Therefore the following instructions for the latter system can be ignored.

5.2 CONTROL SYSTEM

The control system is equipped with a powerful microprocessor and the basic design consists of an internal μ PLC connected to the operator panel; this is a very flexible system which will be able to take any software released in future.

The graphic interface is supported by an operator panel with an LCD display and illuminated push-buttons. The μ PLC completely controls the chamber by means of an analogic-digital interface.

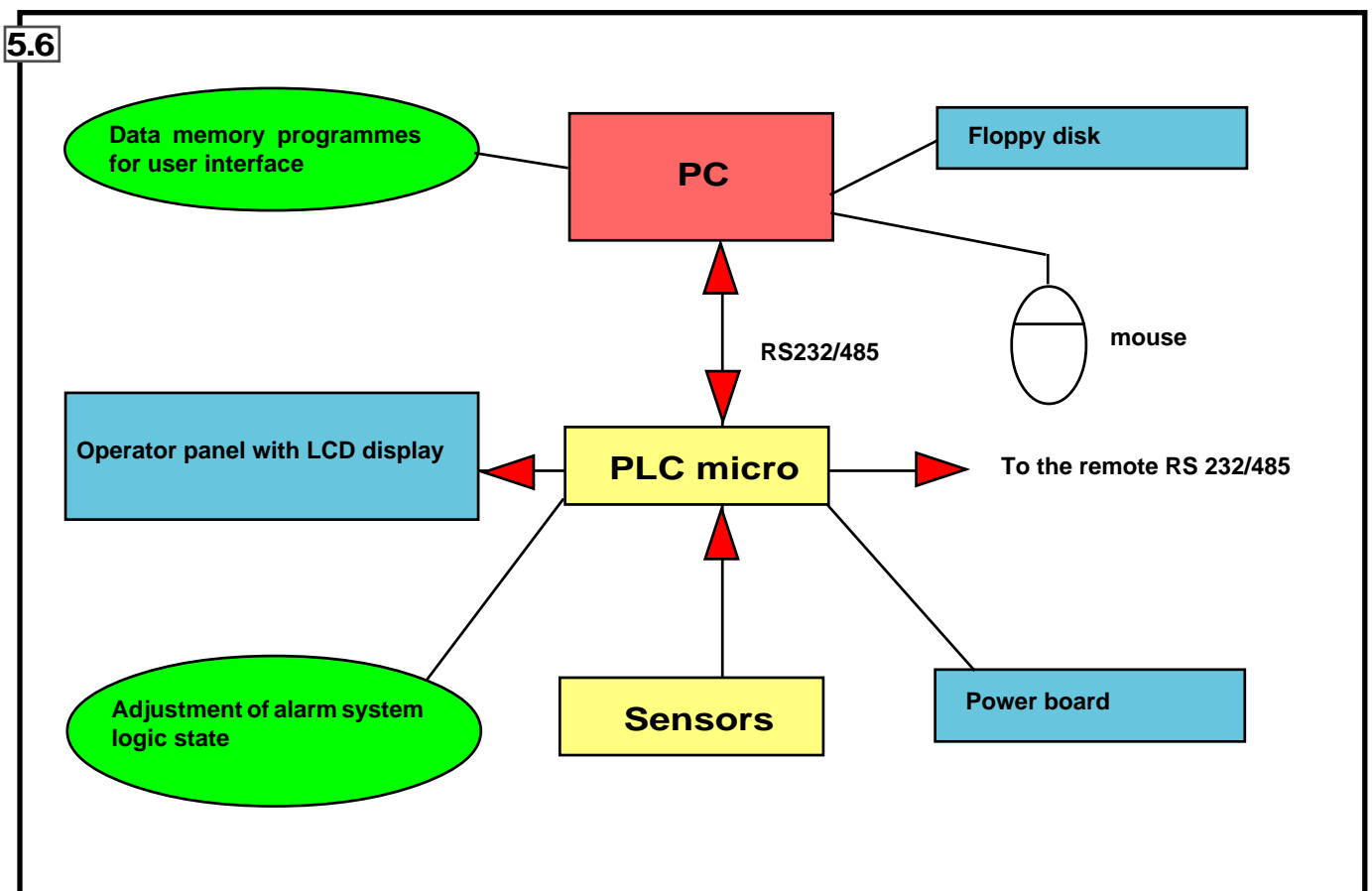
The CHALLENGE chambers are completely run by the operator panel and/or WINKRATOS[®] software manufactured specially by Angelantoni S.p.A.

If WINKRATOS[®] software is used, the chamber is then controlled by an external PC with a serial connection (both the WINKRATOS[®] software and the PC can be purchased as accessories for the chamber).

Both the operator panel and the WINKRATOS[®] control the chamber alarm and safety signals in order to ensure a really reliable system. They also enable complex test cycles to be programmed and memorized on a disk. Auxiliary operations can also be run, the command to open and close the auxiliary contacts can be inserted in the programming of the heat and climatic cycles in order to be able to synchronize the switching on and off of external equipment at precise points in the programmed cycles.

The WINKRATOS[®] software enables external signals coming, for example, from measurement apparatus to be acquired through ten analogic inputs; these signals are converted to digital signals and are inserted inside data log files so they can be memorized and visualized and printed in graphs.

The (optional) printer works either alphanumerically or graphically (as a data logger or as a traditional recorder) and provides a paper copy of the programmes or data log files.



CONTROL PANEL

5.7



1 “START-STOP” switch

Switch used to switch off (by means of a servomechanism) the mains supply to the equipment (380V); the control system remains switched on.

2 Alarm signal

This indicates an alarm condition in the equipment; in this condition the equipment is switched OFF (at the same time the type of alarm is shown on the LCD display).

3 Internal light switch

This is used to switch the internal light on and off.

4 Control panel with touch-screen display

Control panel with touch-screen display used to programme and visualise all the functions and variables to run the equipment. A detailed description of how to use the operator panel is given in the attached instruction handbook for the operator panel.

5.3 COOLING SYSTEM

The cooling system has been optimized to give maximum thermodynamical efficiency and an accurate temperature control.

The system is loaded with ozone harmless fluids: R404A and R23.

Cooling is obtained by the evaporation of the liquid injected into the evaporator.

The compressor compresses the (cooling) gas into the condenser and under the effect of the high pressure and cooling the gas changes state and becomes liquid.

The liquid expands thanks to a thermostatic valve and as it evaporates, it absorbs heat and induces cooling at the same time.

The cycle is completed when the gas is sucked in once again by the compressor.

5.4 DEHUMIDIFICATION SYSTEM

NB: the dehumidification system is installed:

- on climatic machines

- on thermostatic machines equipped with (optional) rise dehumidification

Dehumidification is obtained by “COLD FINGER” technology.

A small, smooth pipe evaporator captures humidity in the air by freezing it without varying the temperature inside the chamber.

The evaporator is fed by the cooling system itself.

The ice which accumulates on the coil will then melt and the resulting condensate is eliminated through the special drainage system.

When the machine is testing “dirty” components, it is advisable not to switch on the recirculation system in order to avoid the **concentration** of impurities (see paragr. “6.2.1 Condensate drain” and paragr. “11 How to clean the demineralized water recirculation system”).

5.5 HUMIDIFICATION SYSTEM

NB: only for machines equipped with this device

Humidification is obtained by directly introducing steam into the chamber.

Water can be used from the mains supply; in fact, the machine has its own water-softening system incorporated.

The direct humidification system uses a special steam generator which introduces steam from heated water, without the risk of dripping inside the chamber.

This direct system has an extremely low response time which enables humidity to be varied very quickly.

This is all controlled by a regulator which considers that the percentage of water contained in the air is a non-linear temperature function.

Measurement of relative humidity is based on a psychrometric system (dry bulb, wet bulb).

The computer notes the dry bulb and wet bulb temperature values and calculates the relative humidity and other parameters necessary for adjustment.

A water storage tank is included in the humidification system in the CHALLENGE chambers in order to give a high level of autonomy during climatic tests even when the chamber is not connected to the mains supply.

5.6 HEATING SYSTEM

Heating is obtained by means of low thermal inertia, stainless steel, electric immersion heaters placed on the internal air recirculation circuit.

5.7 INTERNAL LIGHT

The internal light **19** is lit by pushing button **3** (fig. 5.7) on the control panel.

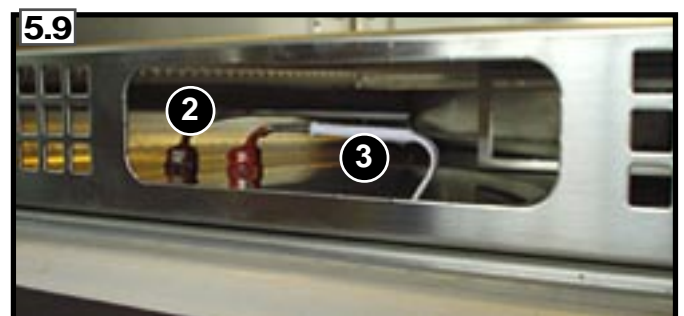
5.8 PROBES

This probe is equipped with gauze the end of which remains constantly immersed in demineralized water.

- Both probes measure the temperature.
- Relative humidity is measured by the psychrometric system.
- For further information please refer to the chapter entitled "MAINTENANCE".



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- 2** Dry bulb probe
- 3** Wet bulb probe (only climatic chambers)
- 19** Lamp

6 INSTALLATION

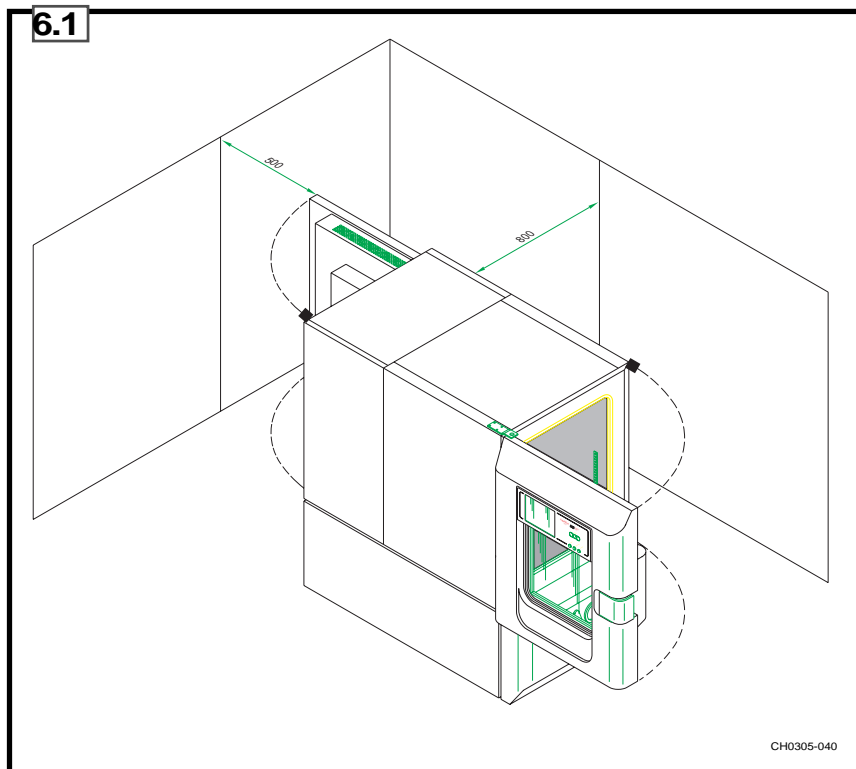
6.1 POSITIONING OF THE MACHINE

In order to bring the machine to the installation site, refer to chapter 4.

During installation remember to leave enough space for work and maintenance operations (fig. 6.1).

Check that the floor is perfectly flat.

Check the ambient conditions of the installation site (see paragr. "3.4 ENVIRONMENTAL CONDITIONS").



WARNING! (only for chambers with humidity control)

The machine cannot operate in ambient temperatures below 0°C; at this temperature the demineralized water for humidification and for the psychometric tank would freeze.

If the machine is left unused in an ambient where the temperature falls below 0°C, it is advisable to empty the demineralized water tank.



WARNING!

The machine has not been designed to operate in areas classed as dangerous (explosive), provided for in the CEI (EIC) norm 64/4. The machine cannot operate in an explosive or corrosive ambient. The machine is not suitable for working outside or in places that are not protected from the weather.

If the user wishes to place the machine on a site that is different from those described above, please contact the manufacturer (Angelantoni S.p.A.) before using the machine.

6.2 PLUMBING

Personnel requisites: specialized plumber.

6.2.1 Condensate drain

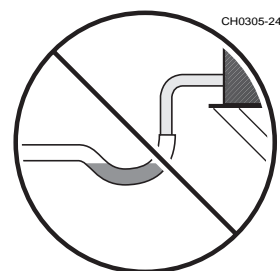
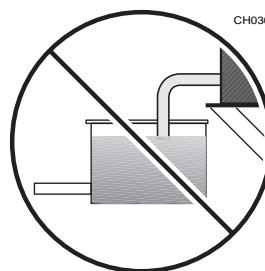
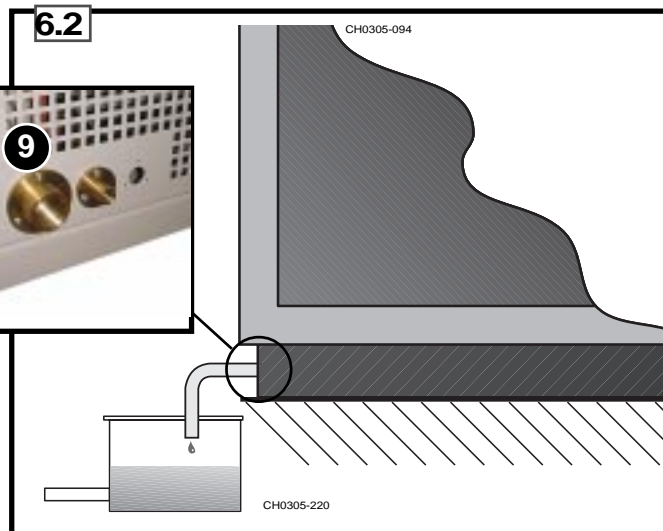
Connect pipe union **9** to the drain line (fig. 6.2); diameter 3/4"G (models 250 - 340), 1"G (models 600-1200-1600).

The end can be connected to a preset drain or else the water can be drained directly into a collecting tray or container, without making any drain-traps along the line.

The drain is a free-fall drain and is not under pressure. The machine is equipped with a system which enables condensate water to be re-used (if it is clean), so that the user can choose whether to programme condensate drain-age to the outside or into the collecting container.

Use a pipe equal or larger in diameter to the machine pipe union.

The connecting pipe will not only enable the condensate water to flow out but it will also balance pressures inside the test chamber in the case of unexpected temperature variations, so no drain-trap should be prepared.



6.2.2 Mains water or demineralized water supply for humidification (only for machines equipped with this device)



The machines equipped with a **humidity control** use a system to introduce steam directly into the chamber. In order to measure internal humidity, a psychometric system (dry bulb - wet bulb) is used and the wet bulb is humidified with demineralized water.

As this equipment has an incorporated demineralizer, water can be taken for the above-mentioned uses in two different ways:

A) directly from the mains supply.

- Prepare a mains water line which has the technical characteristics given in the table below.

B) By pouring demineralized water into the special container:

- No special preparation is necessary.

If the customer has a demineralized water line, he can connect it to the machine instead of using the mains supply.

- Connect the mains water supply to pipe union **10**.
- For data concerning pressure, consumption and dimensions, please refer to the table.

Technical data for the preparation of the mains water line for humidification

Pressure bar (1bar: Pa x 10 ⁵)		Connection diameter	Maximum consumption
min	max		kg/h
0,8	1,2	1/2" G	0,8

Pour the demineralized water directly into storage tank 3 (fig. 6.4).

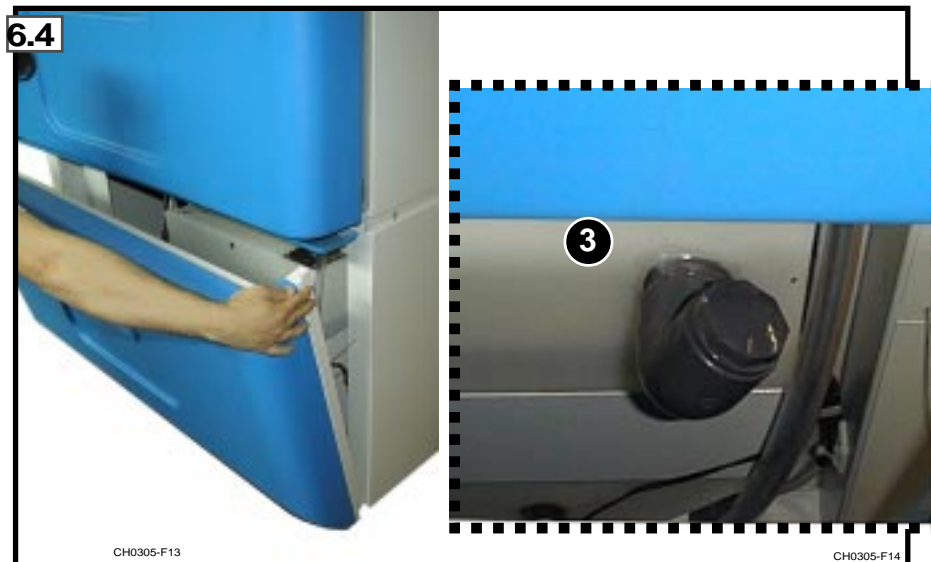
- open the lower hatch door
- unscrew the cap
- use a funnel to pour the water into the connection pipe; the water level can be controlled through the transparent container.

Characteristics of demineralized water:

- maximum conductivity 10 $\mu\text{S}/\text{cm}$.

Daily consumption:

-10 kg/24h maximum



The system is equipped with a sensor to control the water level: if this level should fall below the set limit, a warning message will appear on the display.

6.2.3 Water supply for condenser

(only for machines equipped with this device)

This description does not concern machines with an air condenser.

If the chamber is equipped with a water condenser, adequate plumbing must be prepared with the characteristics described in the table below.

TOWER WATER				WELL WATER				Connections diameter
Pressure bar (1bar: Pa x 10 ⁵)		Temperature °C		Pressure bar (1bar: Pa x 10 ⁵)		Temperature °C		
min	max	min	max	min	max	min	max	
3	6	25	30	3	6	10	18	1/2" G

Regularly check the hydraulic connections and pay special attention to the hose pipes.



The connection pipes between the water plug and the chamber must be hose pipes in order to allow partial movement of the chamber itself during maintenance.

Installation is advisable for regular checks of: thermometer, pressure gauge with pressure reducer and manual on/off valves.



6.3 ELECTRICAL WIRING

Personnel requisites: specialized electrician

The equipment must have a mains voltage value as described in the chapter entitled "Technical specifications" (see chap. 3).

6.3.1 Characteristics of the plug

The plug must have the following specifications:

- **three phase machines**
 - a **3P + N + E, IP 44, 380-415 V** industrial plug, suitable for the absorbed current (see "Technical data") in compliance with the norm EN 6030-1-2.
- **single phase machines**
 - a **P + N + T, IP 44, 230 V** industrial plug, suitable for the absorbed current (see "Technical data") in compliance with the norm EN 6030-1-2.

6.3.2 Socket Board

Use a Socket Board with the following technical specifications:

Industrial socket with a **3P + N + E, 380-415 V, IP 44 cut-off switch with fuse carrier and fuses**, all suitable for the absorbed current (see "Technical data") in compliance with the norm EN 6030-1-2.

6.3.3 General specifications for the electrical system

The socket board must be connected above the machine to a system equipped with a differential switch and with earth systems coordinated according to:

IEC 364-4 art. 413.1, that is to say:

Vc= **Rt*Is<50V**

Vc= **contact voltage**

Rt= **earth plate resistance**

Is= **differential device sensitivity current**

If national laws or regulations enforce more restrictive Rt values, these must be complied with.



This equipment can be considered electrically safe only when it has been correctly wired and an efficient earth system has been installed as foreseen by the safety norms in force. This fundamental point of safety must be checked and if you are in any doubt, ask for the system to be accurately checked by professional qualified personnel.

Certain fundamental rules must be followed when using this machine as when using any electrical machine, such as:

- **do not touch the equipment with wet or damp hands or feet.**
- **do not place the machine on normally wet floors.**
- **do not use extensions in bathrooms or showers.**
- **do not pull on the supply cable in order to disconnect it from the mains supply.**

6.3.4 Electrical wiring

The machine is supplied with a cable already connected to the panel terminal board; so the plug (of the type specified in point 6.3.1) has only to be connected to the other end of the cable (paragr. 5.1 n° 1).

Any connections made to lengthen the cable should use a Plug/Socket type in compliance with EN 60309-1-2.

Voltage drop should be checked according to the formula

$$\underline{DV} = K \cdot L \cdot I < 4\% \quad \text{where:}$$

DV= **voltage drop**

V = **supply voltage**

K = **characteristic cable coefficient**

L = **cable length**

I = **absorbed current**

The machine does not need another earth.

The system earth will be sufficient.

The supply cable should be completely unrolled so that it is not squashed in any way.

Only for three-phased chambers:

Check the rotation direction of the fan motor inside the chamber.

The correct rotation direction is shown by the arrow marked on the motor itself.

6.3.5 Earth connection

The yellow-green wire of the supply cable fastened tightly into the plug will provide the equipment with adequate protection.

6.3.6 Preferential supply for the internal computer

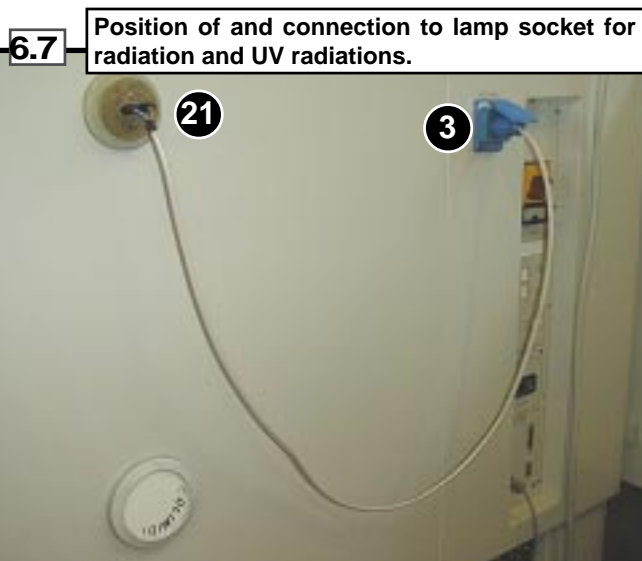
In order to supply the computer inside the equipment with a preferential line coming from your uninterruptible power supply unit (UPS), use the terminals prepared inside the electrical board (see attached electrical wiring diagram). To install your UPS disconnect the jumps placed on these terminals that allow the operating without UPS. Wiring must be carried out by an authorized technical assistance service. If the chamber is supplied with UPS already installed don't follow that has just been previously written.

6.3.7 Lamp connection for irradiation and UV radiations

(For machines equipped with this accessory)

The UV lamp is installed at the factory and the machine is, therefore, supplied with this device, the relevant connection socket and the lamp that must be assembled (see paragraph 9.3).

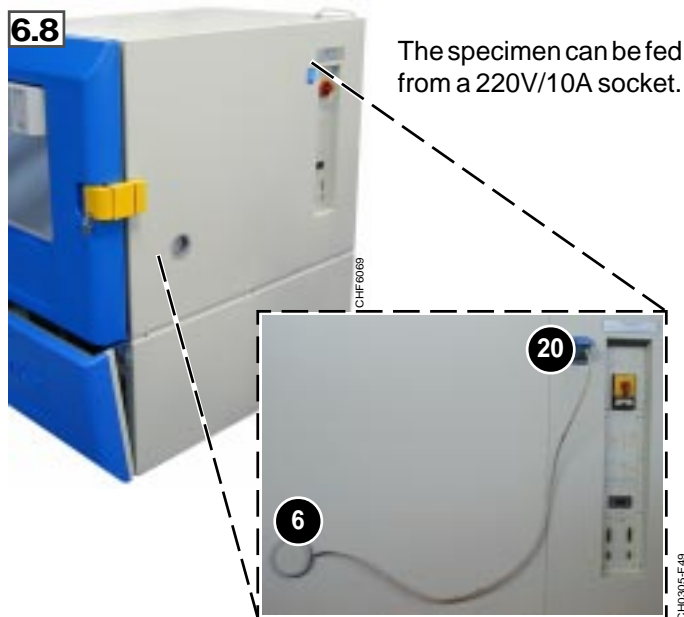
- | | |
|----|--------------------------|
| 3 | UV lamp supply socket |
| 21 | Hole to house U.V. lamp. |



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6.3.8 Specimen power supply connection

(For machines equipped with this accessory)



- | | |
|----|-------------------|
| 6 | Feed-through hole |
| 20 | Socket |

- Insulate the feed-through hole 6 correctly.

This accessory is equipped with a temperature-rise protection system using the thermostat 5.1 (fig. 6.8) which, if set correctly (see paragraph entitled Hardware alarms), will switch off the power supply to the specimen. In order to turn on the power supply to the specimen, switch on the machine again.

6.3.9 Interface and serial port connection



- | | |
|-----|--|
| 5.1 | Alarm signal electronic thermostat (fig. 8.3) (stops the equipment when the temperature exceeds the preset limits) |
| 5.2 | DIGITAL IN/OUT connector (fig. 6.10) connection of auxiliary contacts digital and input/output signals (enables customer's own operations) |
| 5.3 | ANALOGIC IN/OUT connector (fig. 6.11) connection for analogic inputs (connection for user's auxiliary probes) |
| 5.4 | RS 232/485 IN connector (fig. 6.12) RS 232 serial (RS 485 on request) |
| 5.5 | RS 232/485 OUT connector (fig. 6.13) RS 232 serial (RS 485 on request) |
| 5.6 | Main switch (isolator switch) |

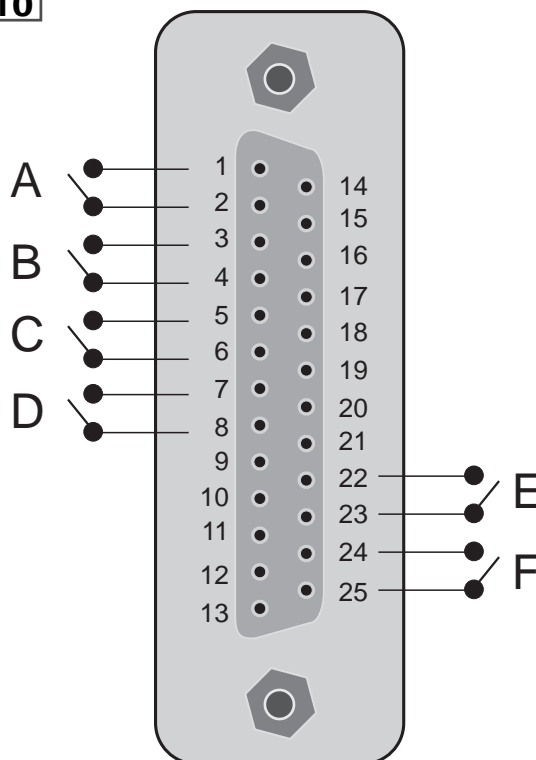
DIGITAL IN/OUT connector (5.2)



These configurations on the connectors will be activated on request.

OUTPUT DESCRIPTION		PIN
A-	Clean contact NO (AUX 1 output)	1 - 2
B-	Clean contact NO (AUX 2 output)	3 - 4
C-	Clean contact NO (AUX 3 output)	5 - 6
D-	Clean contact NO (AUX 4 output)	7 - 8
E-	Clean contact NO (user's equipment)	22 - 23
F-	Clean contact NO for remote control alarm	24 - 25

6.10



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ANALOGIC IN/OUT Connector (5.3)



These configurations on the connectors will be activated on request.

If the user has put his own sensors inside the test chamber which produce analogic signals (0-10 V or 0-20 mA), these may be acquired by the built-in computer and visualized and/or memorized.

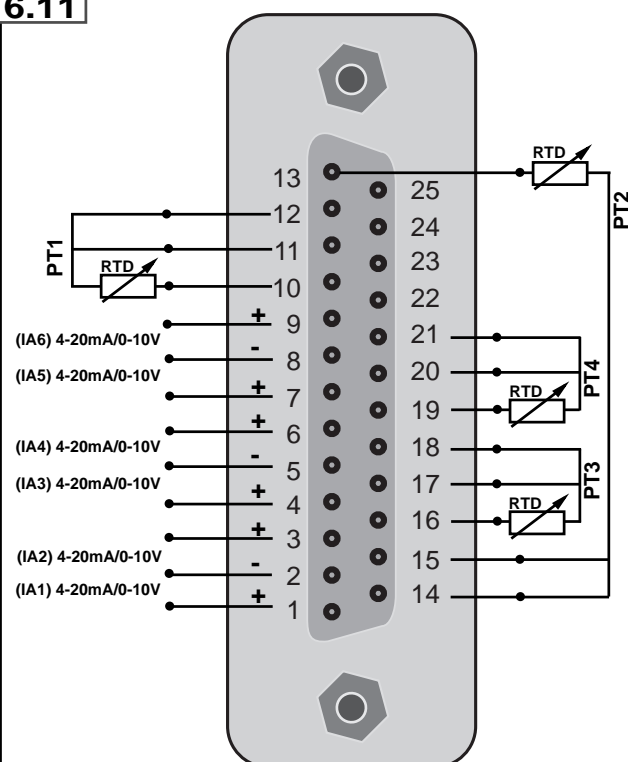
The type of configuration for each channel is set at the factory on special jumpers on the μ PLC board.

The description of the connector pins follows below:

This connector is used to connect to the control system:

- probes PT 100 (RTD) to be placed inside the chamber, to be connected to terminals PT1, PT2, PT3, PT4.
- Proportional signals to be connected to inputs IA1, IA2, IA3, IA4, IA5, IA6.

6.11



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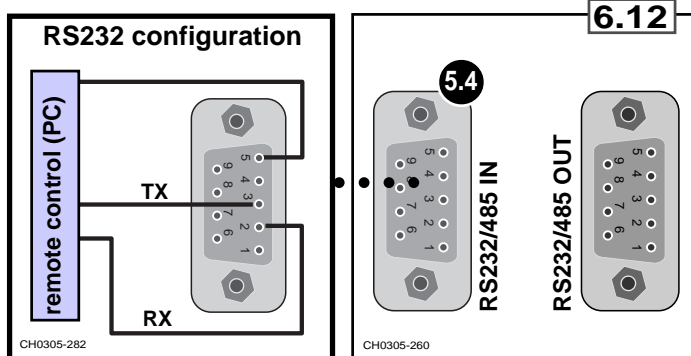
ANALOGIC INPUT	PIN (+)	PIN (-)
IA 1	1	2
IA 2	3	2
IA 3	4	5
IA 4	6	5
IA 5	7	8
IA 6	9	8

PT100 PROBE INPUT	PIN A	PIN B	PIN ONLY
PT 1	12	11	10
PT 2	15	14	13
PT 3	18	17	16
PT 4	21	20	19

RS 232/485 IN connector (5.4) (fig. 6.12)

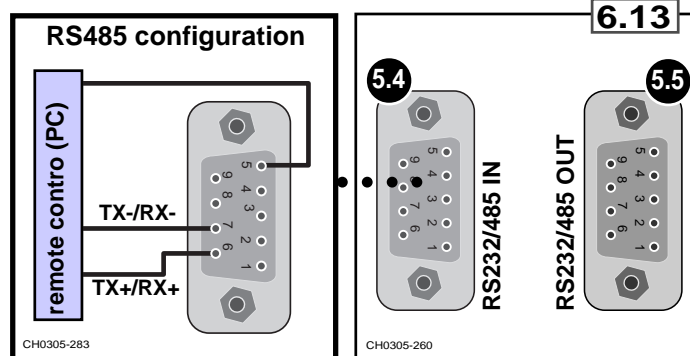
Serial interface

This connector is usually used for the remote control of the chamber by means of a PC with WINKRATOS® software by Angelantoni S.p.A.



RS 232/485 OUT connector (5.5) (fig. 6.13)

This connector is used only with the RS485 configuration to connect several machines to each other and to use a single remote control with one PC (fig. 6.16).

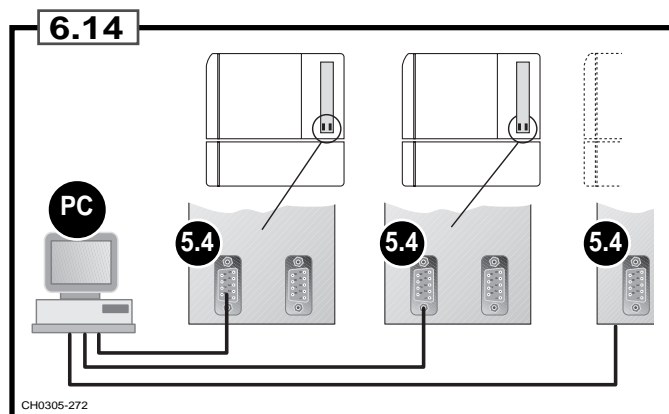


WINKRATOS® SYSTEM

STANDARD CONFIGURATION

The WINKRATOS® system is able to operate several machines at the same time.

Each RS232 computer serial port (PC) is connected to each RS232 connector (paragr. 5.4 fig. 6.14).



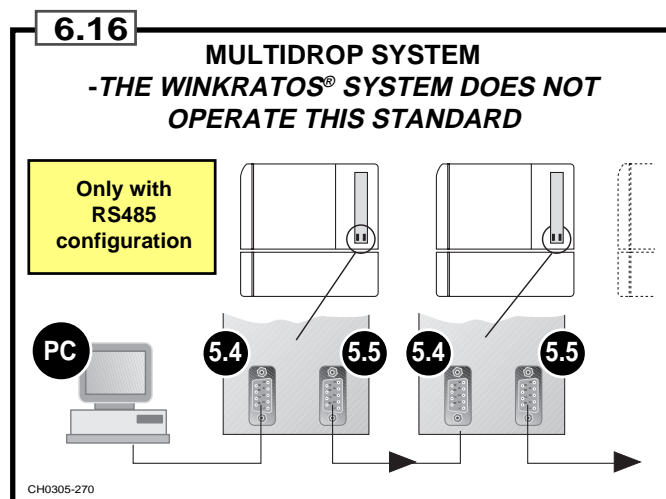
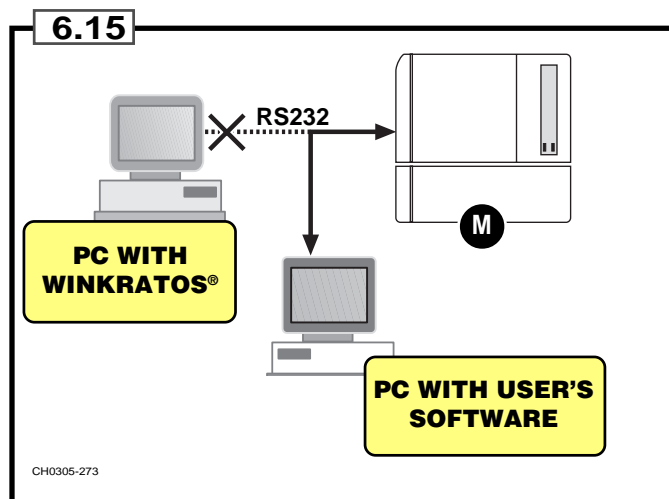
As shown in the fig. 6.16 the connector can also be used in the standard RS 485 for a MULTIDROP connection of several machines on-line.

IN THIS CASE THE CONFIGURATION OF THE MACHINE'S INTERNAL MICROCONTROLLER MUST BE SET UP BY THE MANUFACTURER.

The RS 485 standard can also be used with special software that could also be realized by the user.
The WINKRATOS® system does not operate this standard.

CONNECTION WITH THE USER'S SOFTWARE

If the user needs to manage the chamber in his own way, he can project his own dedicated software and connect a computer to the connector 5.4 (fig. 6.16). To cope with this need it is necessary to expressly require to the manufacturer the documentation relative to the communications protocol. The communication protocol allows to know the data exchanging mode between the user's software and the machine M (fig. 6.15).



7 USE FORESEEN BY THE MANUFACTURER

7.1 AIM OF THE MACHINE

The machine has been designed to carry out temperature and humidity tests on components and electrical equipment. The machine is also suitable for temperature and humidity tests on industrial and pharmaceutical products (CHALLENGE -E series).

Before placing any object whatsoever inside the chamber, make sure that the object itself will not be damaged by the test temperature.

For further information, please refer to chapter 3 entitled "Technical specifications".

7.2 MACHINE END-USE

The machine has been designed to be used in companies and must only treat the objects mentioned in paragraph 7.1. Before treating different materials from those indicated in paragraph 7.1, please contact the manufacturer to obtain a specific authorization.

7.3 OPERATOR

No special technical knowledge is needed to use this machine.

The operator should read this handbook carefully. However, experience with the use of electrical and electronic equipment would be preferable.



Special attention must be paid to the temperatures which can be reached inside the test chamber. The values in the temperature field for all the equipment referred to in this handbook are shown in the tables in chapter 3 "Technical specifications". Before opening the door to handle the tests, set the equipment to values close to ambient temperature and give enough time for temperature to stabilize itself; wear special gloves that resist at high/low temperatures.

7.4 USE LIMITS

The machine can only be used by specialized personnel.

The machine can be switched on only once the compressor oil has been heated.

If the machine has been left unused for over 48 hours, the oil heating procedure must be carried out as described in paragraph 8.1.

The machine may be used within the temperature and humidity range described in chapter 3 entitled "TECHNICAL SPECIFICATIONS".

This series of machines must not contain:

- **inflammable and/or explosive liquid or solid materials.**
- **liquid or solid materials which could generate inflammable gases during evaporation or sublimation.**
- **liquid or solid materials containing chemically aggressive substances.**
- **liquid or solid materials could generate aggressive fumes during evaporation or sublimation.**



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Always set the relevant software and hardware alarm devices before carrying out a temperature cycle (paragraph 8.2).

7.5 USE OF PROTECTIVE CLOTHING

Suitable protective clothing should be worn according to norms in force in order to protect:

- against the temperatures of the test chamber and of the test materials if time is not given for the temperature to reach acceptable values.

7.6 DANGEROUS AREAS AND WASTE RISKS



During tests personnel should not enter the chamber or touch the test products; the chamber holds risks at both high and low temperatures.

Take all the necessary precautions and wear suitable protective clothing.

If the chamber is opened at high or low temperatures, the gaskets could be damaged.

8 START-UP

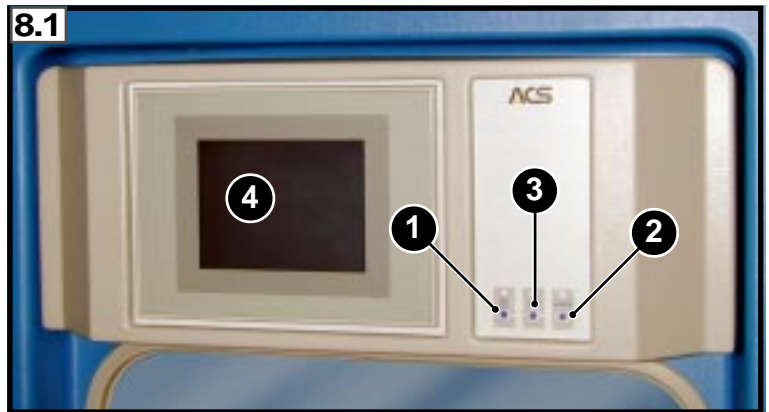
- Check that the mains supply voltage is the same as the one marked on the rating plate.

8.1 COMPRESSOR OIL HEATING



This operation is not necessary **CHALLENGE -E serie chambers**.
Never start a temperature cycle immediately after start-up.
First heat the compressor oil otherwise serious damage could be caused.

- Turn on the main switch (isolator switch) on the machine.
- Press the START/STOP button 1 (fig. 8.1).



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If the machine has not been operated for over 48 hours:

- Wait 8 hours before starting a temperature cycle.
- The oil heating system will switch off automatically.

If the machine has not been operated for less than 48 hours:

- Wait for about 1-2 hours before starting a temperature cycle.
- The oil heating system will switch off automatically.



In order to avoid dead time due to compressor oil heating, leave the machine with the main switch pointing to I (ON) and the START/STOP key pointing to START (lamps lights).

8.2 ALARM SET-UP

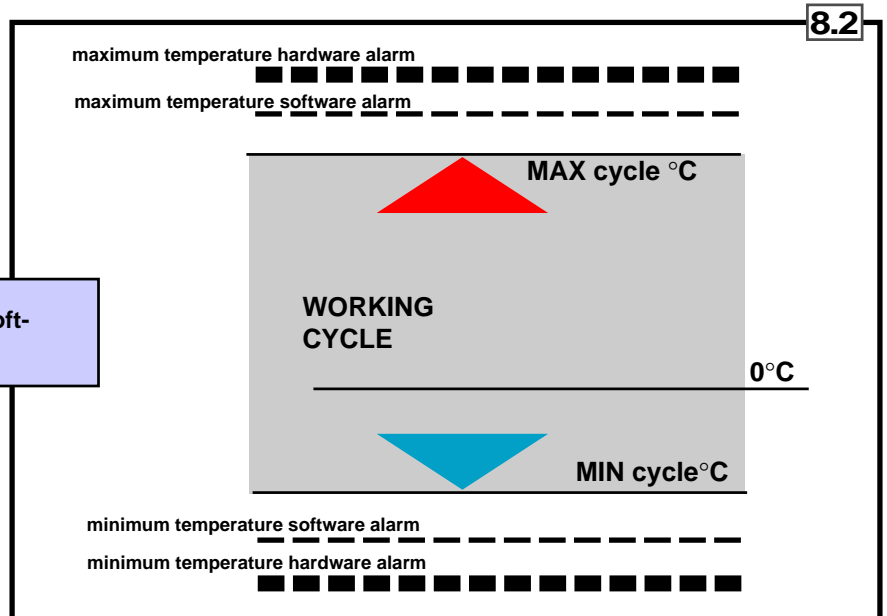


Always set the relevant software and hardware alarm devices before carrying out a temperature cycle.

Set-up of temperature alarms should be carried out preferable before programming, recalling or carrying out a work cycle. The machine has three alarm levels:

- **Software alarms (paragr. 8.2.1) for maximum and minimum temperature** — — —
- **Hardware alarms (paragr. 8.2.2) for maximum and minimum temperature** ■ ■ ■ ■
- **Fixed alarm for maximum temperature (paragr. 8.2.3)**

Theoretical diagram of positions of software and hardware alarms



8.2.1 Software alarms

These are set on the control panel **4** (fig. 8.1).

For information on how to operate this programming, please refer to the attached OP7 instruction handbook.

When a temperature cycle (either manual or automatic) has been established, the alarms must be set immediately:

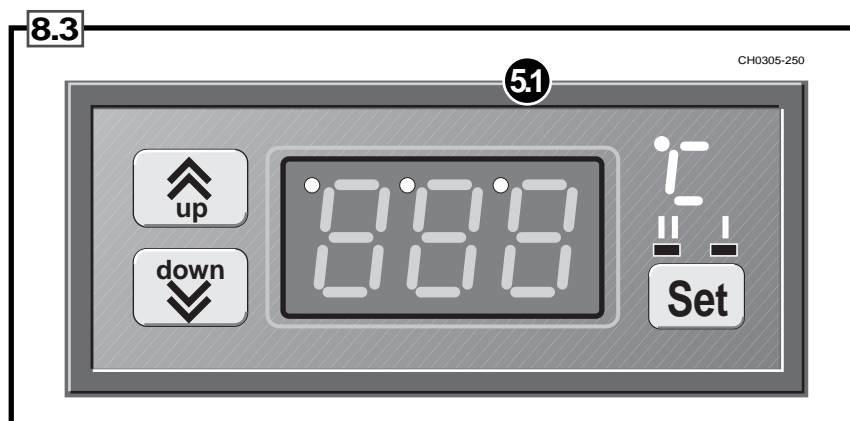
- **maximum temperature alarm:** about 5°C above the maximum set value
- **minimum temperature alarm:** about 5°C below the minimum set value.

8.2.2 Hardware alarms

These are set only on the instrument **5.1** (fig. 8.3).

When a temperature cycle (either manual or automatic) has been established, the alarms must be set immediately:

- **maximum temperature alarm:** about 5°C above the maximum set value
(or a few degrees above the set software alarm)
- **minimum temperature alarm:** about 5°C below the minimum set value.
(or a few degrees below the set software alarm)



Maximum temperature alarm set-up (channel 1)

- Press the SET key: the led warning light 1 will flash.
- Press the UP and DOWN keys to set the value.
- Wait a few seconds, led warning light 1 will stop flashing and the new value will be memorized automatically.

Minimum temperature alarm set-up (channel 2)

- Press the SET key twice: the led warning light 2 will flash.
- Press the UP and DOWN keys to set the value. Wait a few seconds, led warning light 2 will stop flashing and the new value will be memorized automatically.

After pressing the UP and DOWN keys continually, the variation speed is increased after a few seconds.

Under normal operations the two led lights should always be switched on. When a maximum or minimum alarm condition occurs, the relevant led light switches off (led light 1 for maximum, led light 2 for minimum).

Do not press the SET button for more than three seconds. If this should happen by mistake, the instrument will enter the programming mode.

Do not touch or modify anything! The instrument will automatically return to the normal operation mode after a few seconds.

Modification of parameter programming could prevent the instrument from operating correctly. If this should occur, contact the ANGELANTONI Industrie S.p.A. technical assistance service before carrying out the test.

Error signals

The instrument also visualizes the following messages:

“—” probe has short circuited

“EEE” probe interrupted, probe not connected or upper/lower visualization limits of the instrument have been exceeded.

If the probe is damaged, please contact the ANGELANTONI Industrie S.p.A. technical assistance service. If the probe has to be replaced, make sure that probe connections are also checked at the same time.

8.2.3 Fixed alarm for maximum temperature

- This is triggered when the maximum admissible temperature value is exceeded accidentally.
The voltage is switched off and the technical assistance service must be contacted.

8.3 OPERATIONAL CHECK

- Set a temperature value (e.g. 20°C) on the control panel and start a work cycle (refer to the attached OP7 handbook).
- Open the upper door (only for three-phased chambers) and check that the chamber fan motor is turning in the direction indicated by the arrow marked on the motor itself.
If the motor is turning in the opposite direction, change over the phases on the supply. The operation must be carried out by qualified personnel.

8.4 CONTROL OF WET BULB GAUZE (climatic chambers)

Before carrying out a climatic cycle (temperature-humidity):

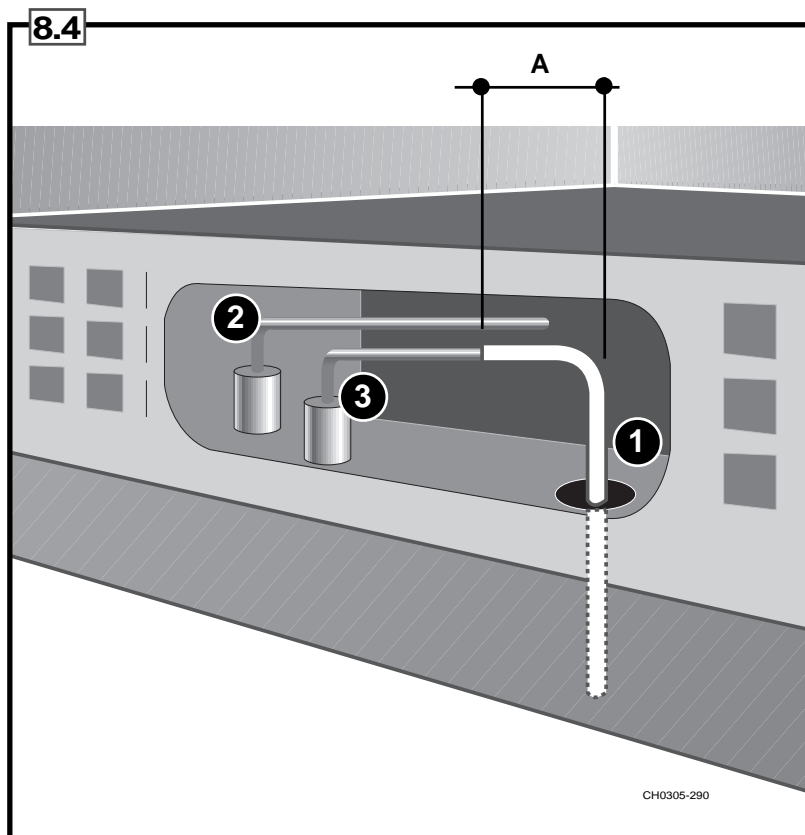
- Fill the humidification system tank with demineralized water or open the water supply circuit.

Gauze **1** must always be kept clean and white, that is to say intact; if it shows a deposit or appears dirty or blackened, replace it immediately.

The gauze must always be wet.

When climatic tests are not being carried out, remove the gauze to avoid its wear and tear.

- | |
|---|
| <p>1 Wet bulb gauze
(A= 30 mm min.)
(Length about 120 mm)</p> <p>2 Dry bulb probe</p> <p>3 Wet bulb probe</p> |
|---|



Tests at high temperatures may mean that the gauze has to be replaced for each test.

9 USE

- Before carrying out any test cycles, start up the machine as described in chapter 8 and always remember to:
 - heat the compressor oil (paragraph 8.1);
 - set the alarms (paragraph 8.2);
 - check the wet bulb gauze (paragraph 8.4) (only for climatic chambers).
- Open the tap above connection **10** (figs. 9.3-4) for a supply of demineralized water or directly fill the special container **3** (fig. 9.2) (only for climatic chambers).
- Open the tower or well water supply at connection **12** (fig. 9.4) (only for machines equipped with water condenser).
- Check that the plug to close the port hole is closed (fig. 9.1).

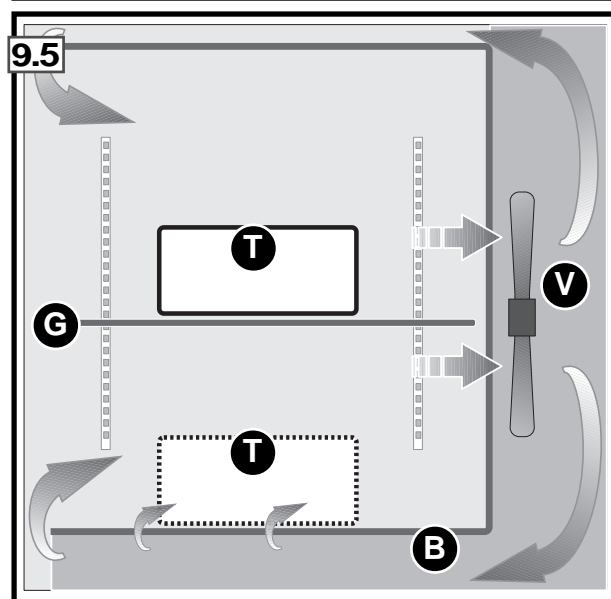
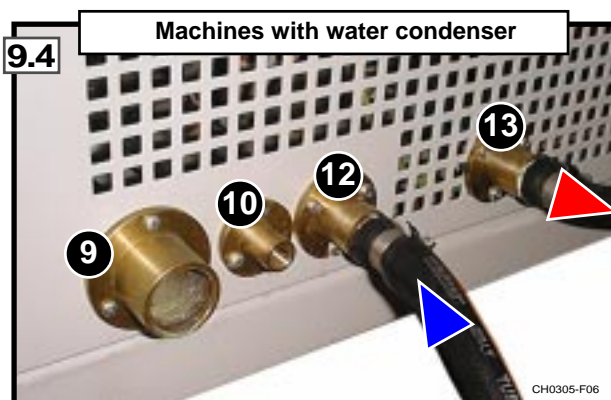
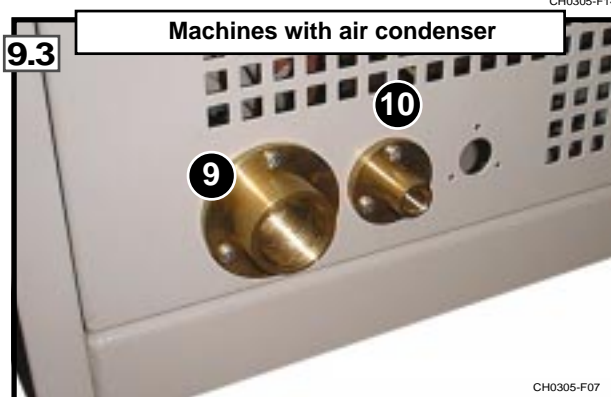
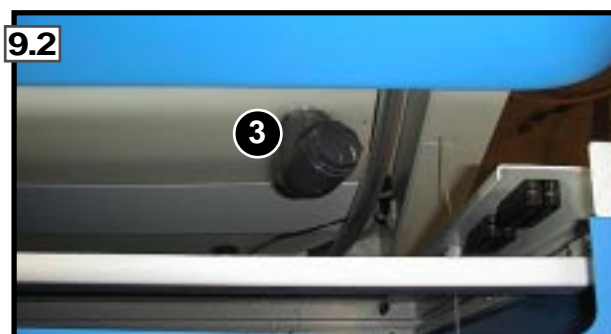


9.1 LOADING OF THE PRODUCT TO BE TESTED

- The products to be tested can be placed on the mobile grid shelves **G** and on the base **B**.
- Take care not to obstruct the air recirculating holes when you put the products to be tested into place.
- Use the already prepared port hole for external connections.



- If you have used the port hole for pipes and cables, make sure that the hole itself is adequately closed and insulated.



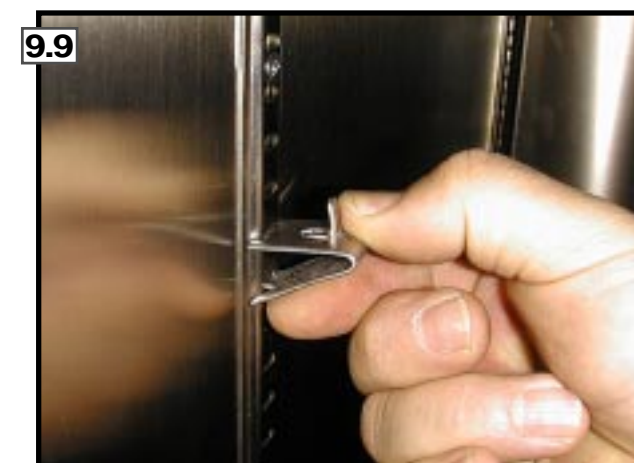
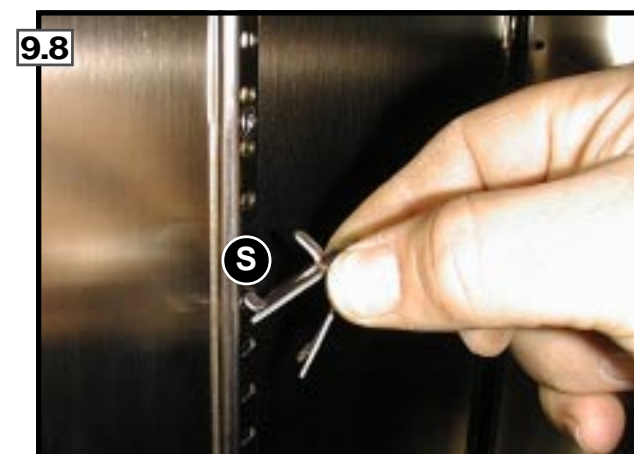
Warning! the chamber can reach dangerous temperatures so make sure that the door is locked and remove the key from the handle so that unauthorized personnel cannot gain access.

Installation of mobile grid shelves

- Open the chamber door.



- Mount supports **S** at the required height and carry out the operations shown in figs. 9.8 and 9.9.



- Insert the grid shelf **G** and check that:
 - it is stable.
 - it rests squarely on the four supports.



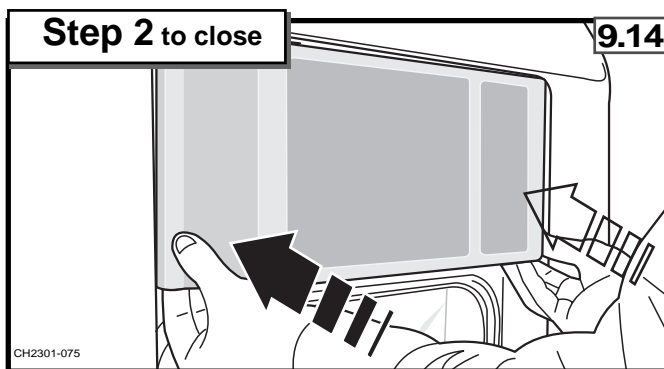
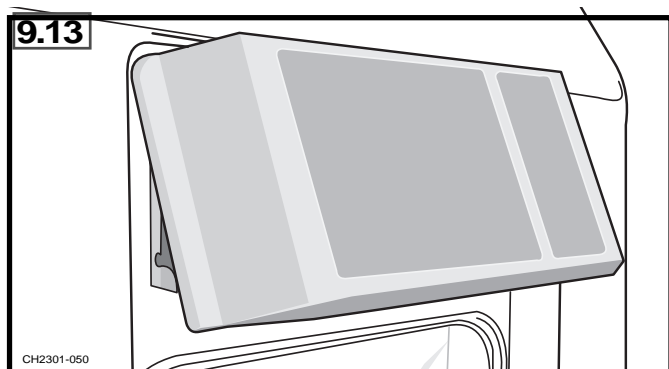
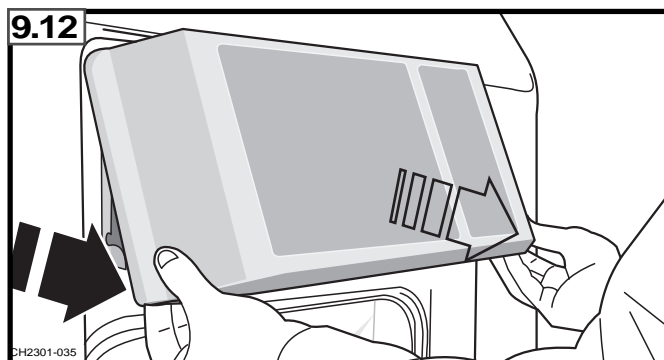
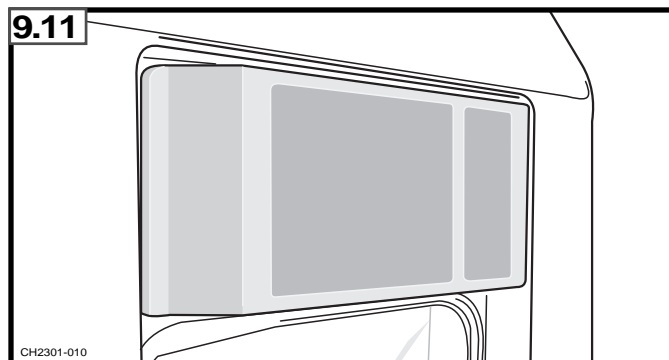
9.2 POSITIONING OF CONTROL PANEL

If the chamber is equipped with a movable control panel, the latter can be inclined upwards or downwards according to the chamber model, in order to facilitate its use by operators of different heights.

In order to change the position of the panel, carry out the steps shown in the following diagrams.

9.2.1 Panel inclined upwards

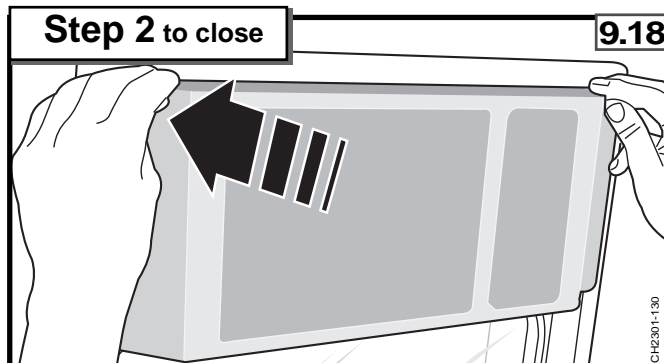
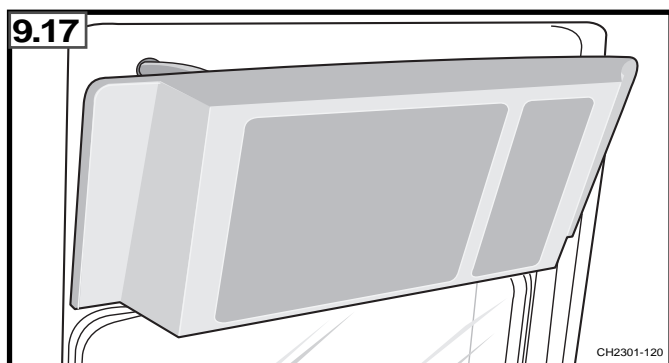
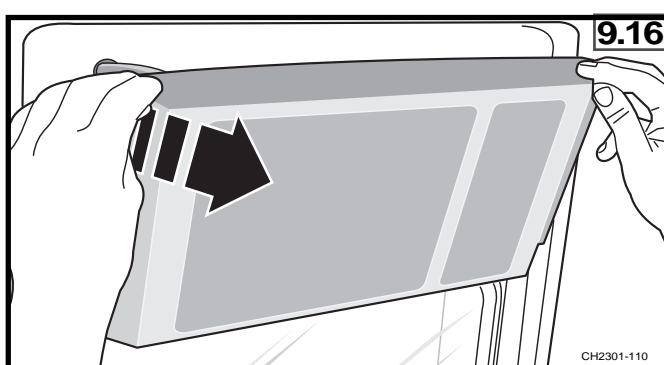
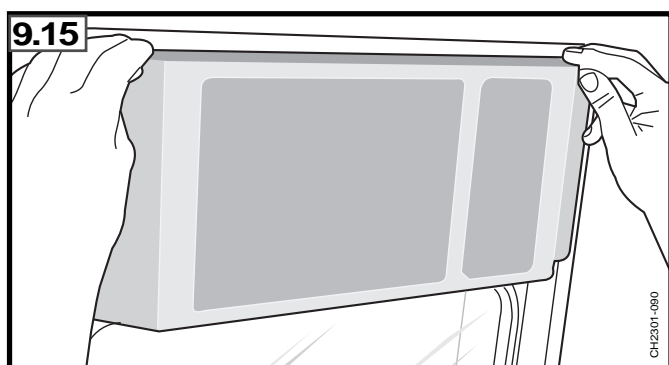
Step 1 to open



Step 2 to close

9.2.2 Panel inclined downwards

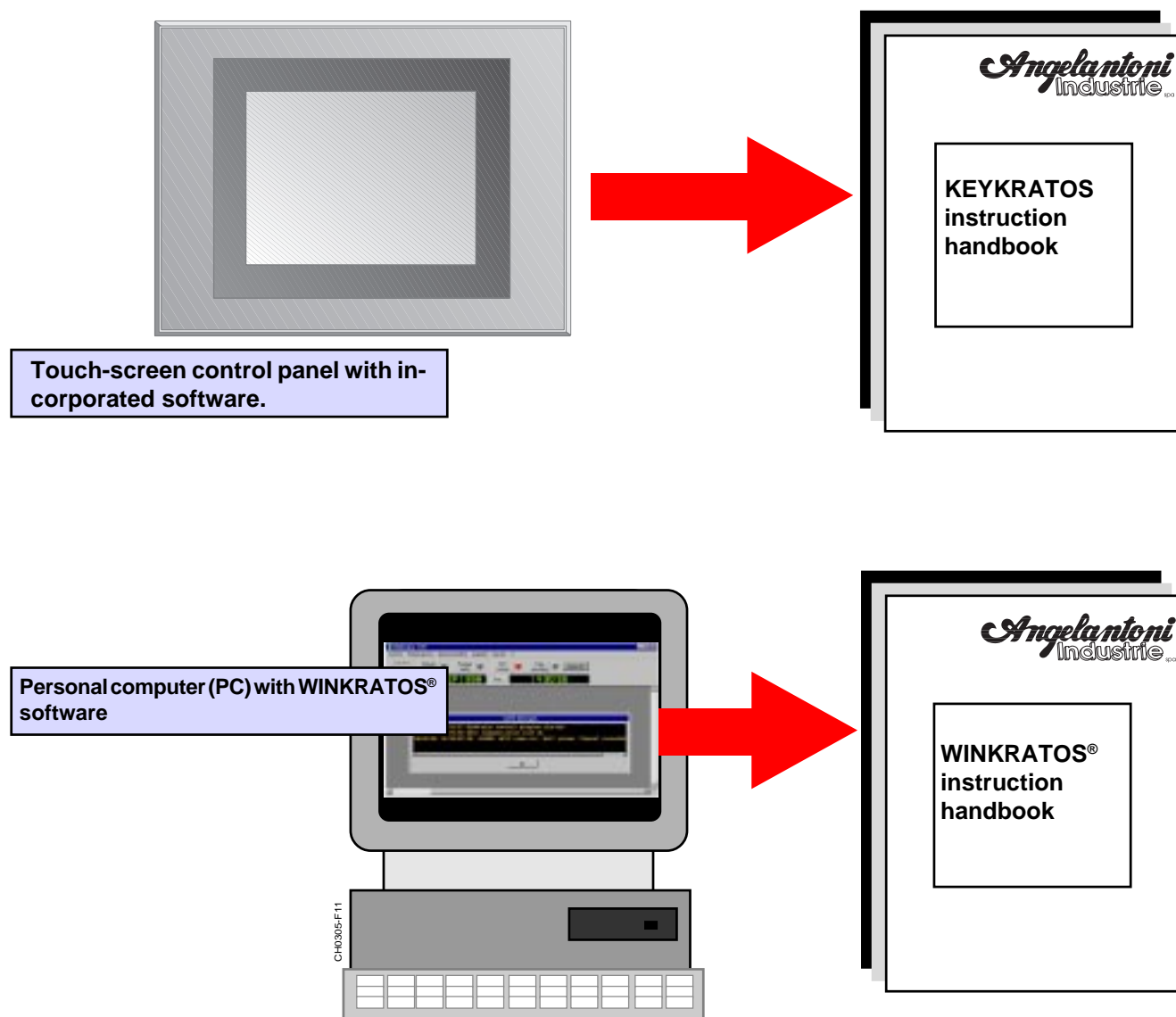
Step 1 to open



Step 2 to close

9.3 SET-UP FOR A TEMPERATURE CYCLE

- To set up and carry out a work cycle with the chamber, please refer to the attached instructions according to the control system with which your chamber is equipped:



The S/W WINKRATOS® package (hereafter referred to only as WINKRATOS®) controls the CHALLENGE thermostatic and climatic chambers both in MANUAL MODE and in PROGRAMME MODE.

The WINKRATOS® software also runs a complete thermoclimatic cycle file and a LOG file of all the operational sessions memorized that need to be registered.

WINDOWS 95 platform with the following specifications:

- Measurement of the pressures of the different parts of the cooling circuit.
- Control of the thermoclimatic variables (by means of μ PLC).
- Control of chamber alarm and safety signals.
- Possibility to run auxiliary switches to control external loads
- Possibility to read and file data referring to additional user analogic inputs.
- WINKRATOS® supports WINDOWS 95 compatible B/W and colour printers

Control system layout:

For the Personal Computer characteristics please refer to the "WINKRATOS®" handbook.

Note: The manufacturer reserves the right to modify the WINKRATOS® software without any obligation to update previous versions and their relevant instruction handbooks.

9.4 UV LAMP (optional)

The ultraviolet ray lamp is generally used for ageing tests on paints, plastic materials, rubber

The lamp can be installed only on machines that have been prepared specially for the lamp at the factory; these machines have been equipped with a hole **21** and socket **3** in which to fit the lamp.

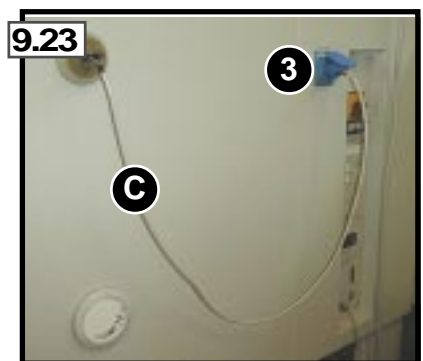
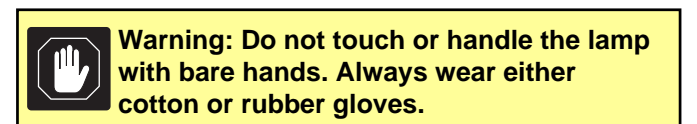
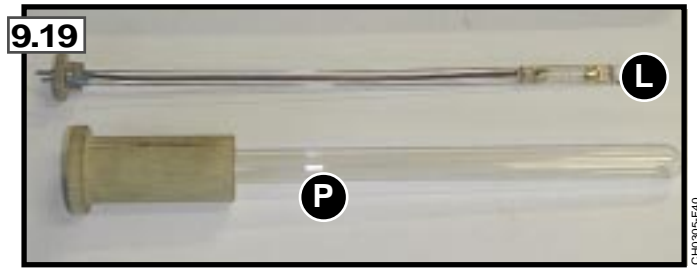
The UV lamp can be used in the following temperature range:

from 0°C to +40°C

When tests are carried out without the UV lamp, remove the latter from the chamber and cover the hole where it fits in; in this way a medium working life (of about 300h) will be guaranteed for the lamp. Replace the lamp very carefully. The UV lamp is automatically switched on.

How to assemble the UV lamp.

- Gently remove lamp **L** from the packaging and insert it into the protective tube **P** (fig. 9.19-20).
- Push it in as far as it will go and use the screws **V** to fasten the two pieces (fig. 9.21).
- Place the whole piece into position on the machine (fig. 9.22) and use the cable **C** supplied with the machine to connect it to the socket **3**.



Lamp specifications:

Supply voltage: 230V
Absorption: 125W

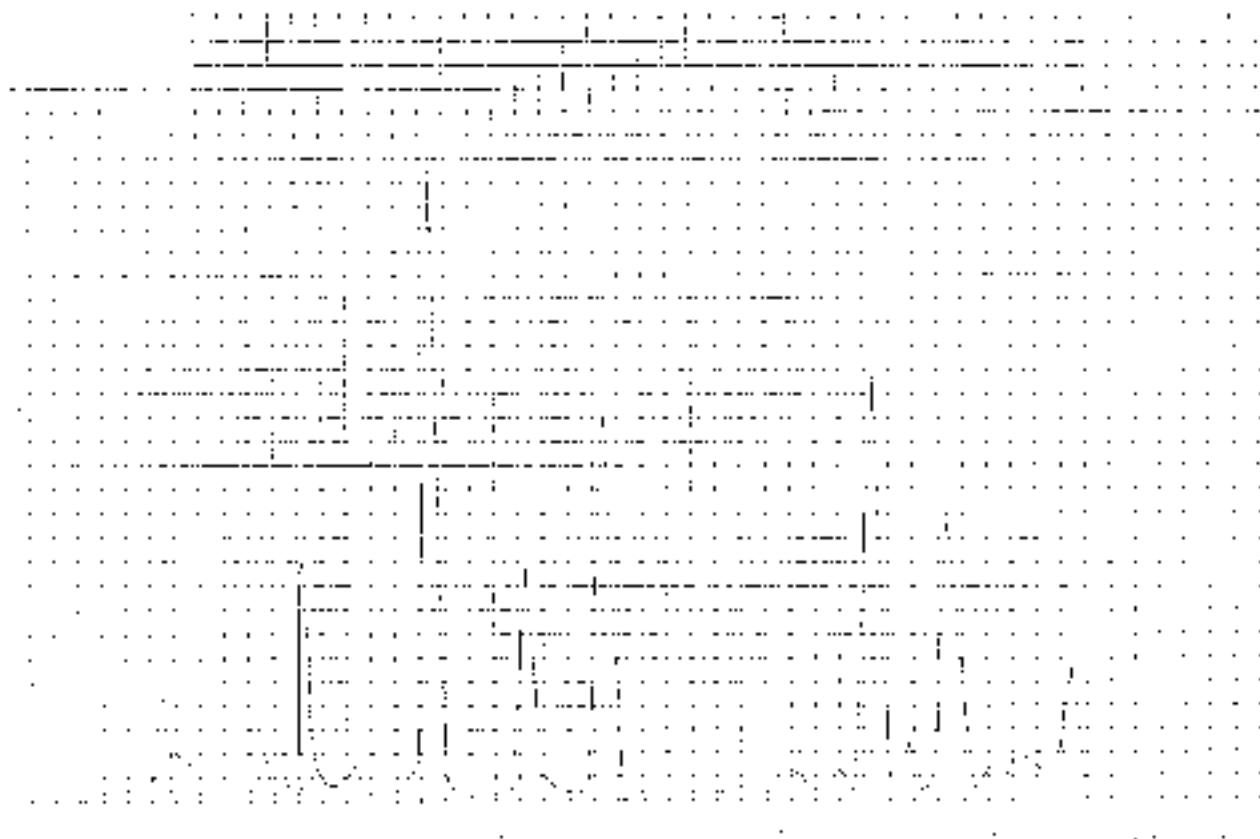


UV rays are dangerous to the eyes.

When the lamp is used on machines with an inspection hatch, the protective screen must always be put into position.



ULTRAVIOLET GENERATOR SPECTRUM FROM 125 W.



9.5 SHUTDOWN

- On the OP7 control panel (see relevant handbook):
in the manual mode press the K1 key;
in the automatic mode put the “*Start progr.*” field of the Cycles menu to STOP.
End of cycle; the machine remains switched on.

or

- turn the START/STOP key to **0 (OFF)**
*The cycle stops but remains set, and restarts when the key is turned to **START***

or

- turn the main switch (isolator switch) to **0 (OFF)** the machine switches off completely. To restart the machine, follow the operations described in paragraph 8.1.

9.6 EMERGENCY SHUTDOWN

- Turn the main switch (isolator switch) directly to **0 (OFF)**.

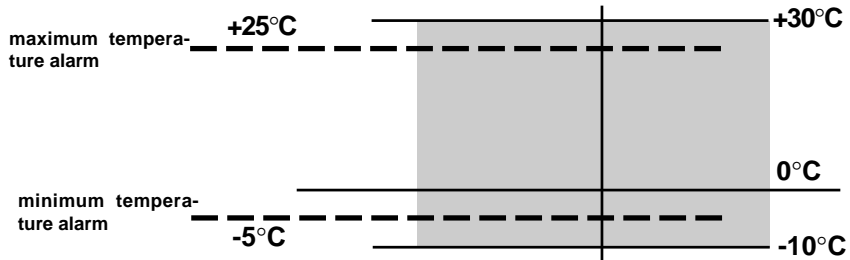
9.7 START-UP AFTER AN EMERGENCY SHUTDOWN

After having eliminated the cause of the emergency shutdown, proceed as follows:

- Turn the main switch to **I (ON)**.
- Reset the cycle and start it up.

If shutdown lasts for a long time, switch on the machine again by following the procedure described in paragraph 8.1.

10 SAFETY DEVICES -CHECK AND SET-UP

SAFETY DEVICE	CHECK	SET-UP
Software thermostat	<ul style="list-style-type: none"> Set a test cycle +30°C-10°C. Programme the maximum temperature alarm 5 degrees below the maximum set value (+25°C). Programme the minimum temperature alarm 5 degrees above the minimum set value (-5°C). 	<ul style="list-style-type: none"> Carry out the cycle and check that the thermostat triggers off.
 <p>The diagram shows a temperature scale from -10°C to +30°C. A test cycle is indicated by a shaded gray area between +30°C and -10°C. Two horizontal dashed lines represent alarm thresholds: the maximum temperature alarm at +25°C and the minimum temperature alarm at -5°C. Labels on the left indicate 'maximum temperature alarm' and 'minimum temperature alarm'.</p>		
Hardware thermostat	<p>To avoid interference between the two thermostats, set the software thermostat outside the test temperature range.</p> <ul style="list-style-type: none"> Set the same preceeding temperature cycle +30°C-10°C. Programme the maximum temperature alarm 5 degrees below the maximum set value (+25°C). Programme the minimum temperature alarm 5 degrees above the minimum set value (-5°C). 	<ul style="list-style-type: none"> Carry out the cycle and check that the thermostat triggers off.
Fuse thermostat	<p>The fuse thermostat is set at the factory at a temperature above the chamber work temperature. When it triggers, it stops the machine. In order to reset it, it has to be replaced by the technical assistance service.</p>	<ul style="list-style-type: none"> If the machine switches on, this shows that the fuse thermostat is working correctly.
Key to lock handle	<p>This key ensures that the machine cannot be opened either accidentally or on purpose by unauthorized personnel. The chamber may be at very high or very low temperatures.</p>	<ul style="list-style-type: none"> Close the door, remove the key and check that the door will not open.



Other safety systems concerning the cooling system cannot be checked or set by the user and are, therefore, described in chapters 11 and 12.



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11 MAINTENANCE

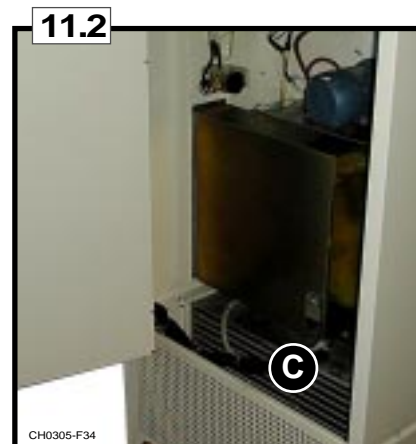
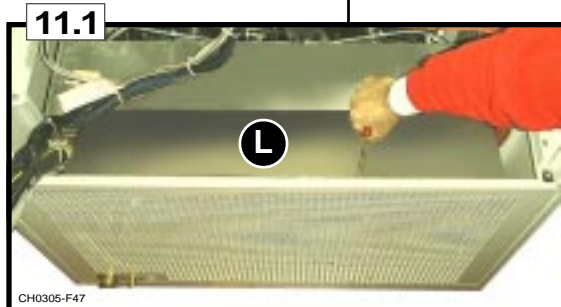


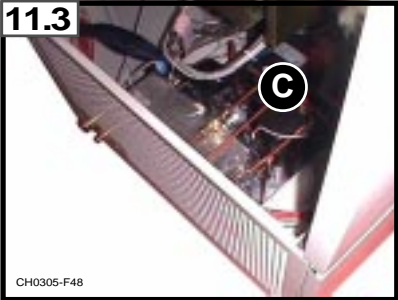



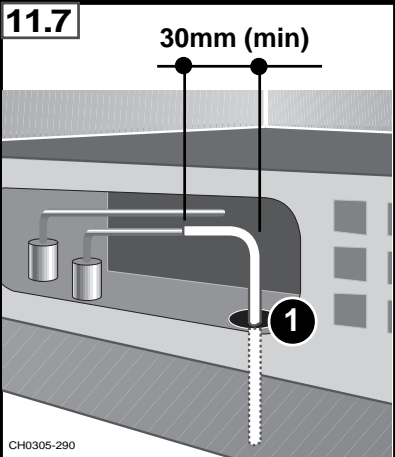
Maintenance must be carried out by qualified personnel.
Some maintenance operations may be carried out when the machine is working and therefore all the necessary safety precautions should be taken.

With the exception of specific cases maintenance operations must be carried out in the following conditions:

- machine switched off
- chamber temperature the same as ambient temperature
- machine disconnected from the mains supply
- supply valves or taps above the machine closed.

MACHINE PART	HOW TO OPERATE	HOW OFTEN
Cleaning of external painted and plastic surfaces	<ul style="list-style-type: none"> • Do not use alcohol or solvents. The painted surfaces could be dulled. Household products to clean metal furniture may be used. Before using a product, we advise trying it on a small surface area out of sight. Do not pour water or any other product that could penetrate the joints between the plates or inside the electrical equipment. 	<ul style="list-style-type: none"> • Once a week or whenever the surfaces are obviously dirty.
Cleaning of stainless steel surfaces	<ul style="list-style-type: none"> • Use specific products on the market. Do not pour water or any other product that could penetrate the joints between the plates or inside the electrical equipment. 	<ul style="list-style-type: none"> • Once a week or whenever the surfaces are obviously dirty.
Cleaning of the keyboard or polycarbonate surfaces	<ul style="list-style-type: none"> • Use a slightly damp cloth and then dry the surfaces immediately. 	<ul style="list-style-type: none"> • Once a week.
Electric cables	<ul style="list-style-type: none"> • Check the condition of the electrical supply cables. 	<ul style="list-style-type: none"> • Once a week.
External connection pipes	<ul style="list-style-type: none"> • Check the condition of the connection pipes. 	<ul style="list-style-type: none"> • Once a week.
Gaskets	<ul style="list-style-type: none"> • Check the condition of the gaskets. If necessary, clean the gaskets with a neutral, liquid detergent. Rinse with a damp cloth. 	<ul style="list-style-type: none"> • Once a week.
Air condenser	<ul style="list-style-type: none"> • Open the rear door and remove plate L (air conveyor) to gain direct access to condenser C. • Do not aim direct jets of air at the condenser! • Use either an industrial or a household vacuum cleaner to remove any dust. • To make this operation easier, use the brushes supplied with the vacuum cleaner. • Take care not to bend the blades of the condenser. • Mount again the plate L before to close the rear door. 	<ul style="list-style-type: none"> • Once a week.



MACHINE PART	HOW TO OPERATE	HOW OFTEN
Air condenser CHALLENGE E SERIES	<p>NB: condensers in the CHALLENGE -E series are smaller than the condensers in the other series.</p> <ul style="list-style-type: none"> It is not necessary to open the rear door. Use either a domestic or an industrial vacuum cleaner to remove all traces of dust from the outside. In order to make this operation easier, use the brushes normally supplied with the vacuum cleaner. 	<ul style="list-style-type: none"> Weekly. <div data-bbox="1082 241 1481 539"> <p>11.3</p>  </div>
Cleaning of hydraulic filter (machines with this device)	<ul style="list-style-type: none"> Take out the filter and clean the inner tube by removing dirt or solid particles. Put the parts together again as shown in the diagram and replace the filter. <div data-bbox="775 600 1169 898"> <p>11.4</p>  </div>	<ul style="list-style-type: none"> Once a week.
	<div data-bbox="483 947 919 1245"> <p>11.5</p>  </div>	<div data-bbox="967 947 1465 1245"> <p>11.6</p>  </div>
	<ul style="list-style-type: none"> Remove the cylinder heads and remove any deposit (the operation must be carried out by qualified personnel only). 	<ul style="list-style-type: none"> Every six months or as soon as the cooling system shows signs of diminished performance.
Compressor oil NB: chamber compressors in the Challenge -E series are air-tight and need no maintenance.	<ul style="list-style-type: none"> Specific anti-freeze MOBIL EAL Artic 22 type oil must be used or its equivalent. 	<ul style="list-style-type: none"> Every 4000 running hours but not over every 24 months.
Wet bulb gauze (climatic machines)	<ul style="list-style-type: none"> Visually check the condition of gauze 1; it must be elastic, clean, white and must have no signs of deposit. In order to replace the gauze, slide out the probe and place the new gauze in position as shown in the diagram. 	<ul style="list-style-type: none"> Each time a climatic cycle is carried out.
<div data-bbox="831 1664 1228 2119"> <p>11.7</p>  </div>		

MACHINE PART

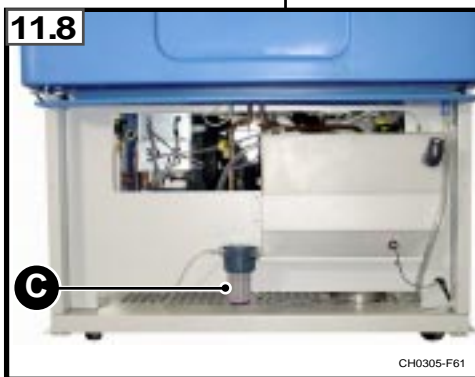
Cleaning of hydraulic cartridge filter
(machines with this device)

HOW TO OPERATE

- Visually check cartridge C and replace it if necessary.
- Remove the bowl and replace the cartridge (only use original spare parts).
- Follow the above operations in reverse to replace the cartridge.

HOW OFTEN

- Whenever necessary but at least once every three months.

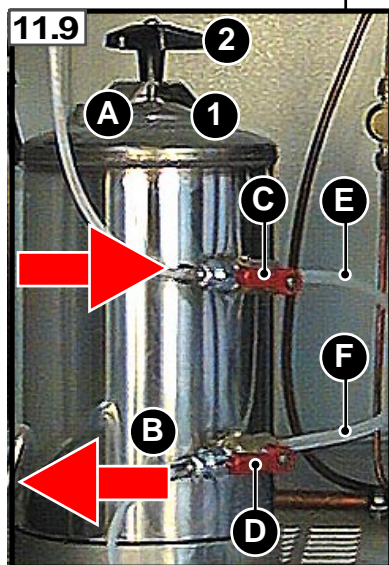


Water softener regeneration

- Only use NaCl (kitchen salt) for regeneration. Do not use either acid or basic substances, solvents or chemical products with this softener. The resins contained in the water softener are necessary for it to operate correctly. Do not throw away the resins. Regeneration time is strictly linked to the amount the softener is used and to how hard the water is. In order to regenerate the water softener, proceed as follows:

- According to water hardness.

LEVER POSITIONS



Work phase	Depression and salt loading stage	Regeneration phase

Depression

- Move levers C and D from left to right.
- Unscrew flywheel 2 and remove cover 1.
- Put in 1 kg of salt (NaCl).
- Clean away any salt or resin remains on the cover gasket.
- Replace the cover and tighten flywheel 2. Turn lever C from right to left.

Regeneration

- Drain the salty water from pipe F until the water is no longer salty (about 40 minutes).
- Turn lever D from right to left as shown in the diagram.

Work

- Turn both levers to the left.

MACHINE PART

Cleaning of recirculation system for demineralized water

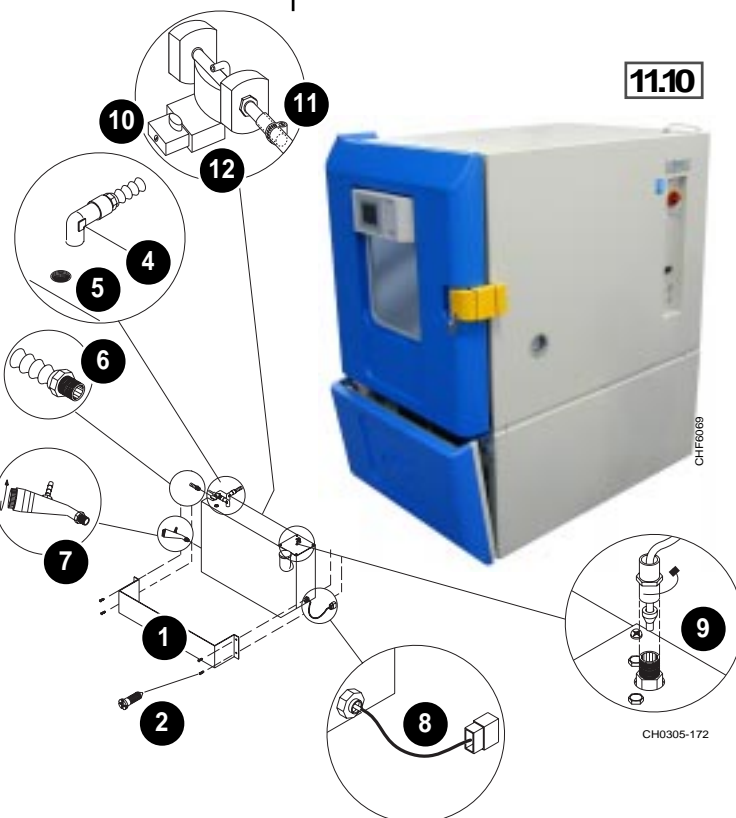
HOW TO OPERATE

- If the objects to be tested are dusty and/or oily, the impurities could be transferred to the water and prevent the system from operating correctly. If the objects to be tested cannot be cleaned, we advise you not to allow the condensate water to flow into the storage tank, but to send it directly to the drain (fig. 6.2). Either the OP7 programme or WINKRATOS® will switch on this option. If this is not possible either, then the inside of the tank must be cleaned after each test and the water in the storage tank must be replaced.

- Open the machine hatch panel below the door.
- Unscrew the opening limit of the machine hatch panel below the door.
- Loosen the special clamp and disconnect the pipe connected to the pipe holder 4 of the psicometric system drain.
- Loosen the special clamp and disconnect the pipe connected to the pipe-holder 6 (overflow).
- Loosen the special clamp and disconnect the pipe connected to the pipe-holder 7 (humidification pump intake).
- Loosen the special sealing nut and disconnect the pipe connected to nipple 9 (replenishment demineralized water)
- Unmount the lower right panel.
- Loosen the special clamp and disconnect the pipe holder 11 (drain).
- Unscrew the screen 10 and disconnect the connector of the solenoid valve 12.

- Separate the connector and disconnect the electric cables connected to the water level sensor 8.
- Remove the screws which hold the structure to bracket 1 and take out the storage tank.
- Use special products to remove the scale and rinse in clean water.
- Replace the tank and reconnect the various parts.
- Switch on the chamber and start a climatic test in order to fill both the psychometric tank as well as the rest of the system.

NB: for maintenance to the mechanical filter 7, please refer to the relevant paragraph.



HOW OFTEN

- Once a month.

UPS (Uninterruptible power supply unit) (machines equipped with this device)

- Simulate a blackout with the load connected, until the battery low warning light switches on (see included handbook).
 - Check that the support time for the UPS group is at least 10 minutes.
 - Keep the unit connected to the mains supply (main switch pointing to on) for at least 6 hours to recharge the batteries completely.
- This operation gives the batteries greater capacity and enables their condition to be checked at the same time.

- Once every 6 months.

12 TROUBLESHOOTING



The maintenance operations that ANGELANTONI INDUSTRIE SpA authorizes are those indicated in the chapter entitled “Regular maintenance”. The information given in the column “SOLUTION” in the tables below does not authorize any operations if these compromise safety; the information is given to help any specialized technicians find the fault.

PROBLEM	PROBABLE REASON	SOLUTION
<ul style="list-style-type: none"> The machine does not start. 	<ul style="list-style-type: none"> There is no supply from the mains. The main switch is pointing to “OFF”. The START STOP switch is pointing to “STOP”. A mistake in the “RUN” programming. Alarm signal on the display. Some other reason not mentioned above. 	<ul style="list-style-type: none"> Check and proceed accordingly. Turn on the main switch. Turn on the START STOP switch. Consult OP7 operator panel and/or the WINKRATOS® sw handbooks and proceed accordingly. Check the description of the type of alarm on the LCD display and eliminate the cause. Call your technical assistance service.
<ul style="list-style-type: none"> The equipment does not reach the set temperature. 	<ul style="list-style-type: none"> Error in setting of setpoint. There is too much material in the test chamber. The test material prevents correct air circulation. The test material dissipates too much heat. The door is not shut correctly. The cooling system is not working correctly. Continual request for “cold”, the compressor stops every now and again. Continual request for “cold”, the compressor works continuously. 	<ul style="list-style-type: none"> Check and modify. Reduce the quantity. Place the material so that air can circulate through the intake and outlet openings. Check and reduce the load that dissipates the heat according to the technical specifications of the chamber. Close the door correctly. Check that the condenser fan is working correctly, make sure that the condenser is clean and check that the ambient temperature of the premises does not exceed the value given in the specifications. If the equipment has a water condenser, check that the system has a sufficient water supply; if the system has a sufficient supply and the difference in temperature between the inlet pipe and the outlet pipe is very low or is inexistent, this indicates that the condenser is blocked and has to be cleaned or replaced (the temperature difference can be measured by simply touching the pipes with your hand). If the above solution does not resolve the problem, contact your technical assistance service. There may be an accidental loss of coolant, contact your technical assistance service.

PROBLEM	PROBABLE REASON	SOLUTION
<ul style="list-style-type: none"> The machine does not reach the set temperature. 	<ul style="list-style-type: none"> The cooling system is not working correctly (continual request for “hot”, the temperature does not rise). The temperature adjustment system does not carry out the requests for hot or cold correctly. The internal fan is not working. Some other reason not mentioned above. 	<ul style="list-style-type: none"> Check the maximum and minimum set temperature values on the hardware thermostat. If this does not resolve the problem, contact your technical assistance service. Contact your technical assistance service. Contact your technical assistance service. Contact your technical assistance service.
<ul style="list-style-type: none"> The machine does not reach the set humidity. 	<ul style="list-style-type: none"> Error in setting of setpoint. The wet bulb gauze is dirty or badly positioned. The wet bulb gauze is dry because there is no water in the supply pipe. Error in temperature control. In this condition there is also an error in humidity control. The test material prevents air from circulating correctly. The test material dissipates too much heat. The door is not shut correctly. Continual request for “humid, (the dehumidification system is not working correctly). Continual request for “dry”, (the dehumidification system is not working correctly). The humidity adjustment system does not carry out the requests for humid or dry correctly. 	<ul style="list-style-type: none"> Check and modify. Check and reposition correctly or replace. Contact your technical assistance service Follow the “solutions” given for “the machine does not reach the set temperature value”. Place the material so that air can circulate through the intake and outlet openings. Check and reduce the load that dissipates the heat according to the technical specifications of the chamber. Close the door correctly. Contact your technical assistance service. Contact your technical assistance service. Contact your technical assistance service
<ul style="list-style-type: none"> The machine is noisy. 	<ul style="list-style-type: none"> The chamber is not resting correctly on the floor. Contact with foreign bodies. Fault in the mechanical parts. The chamber has been placed on a site with a lot of reverberations. 	<ul style="list-style-type: none"> Check. Check that foreign bodies, such as cartons or other structures are not touching the equipment thus causing vibrations during operations. Check that moving mechanical parts e.g. fans are not making a noise. Contact your technical assistance service.
<ul style="list-style-type: none"> The light does not switch on. 	<ul style="list-style-type: none"> Lamp burnt out. Faulty switch. 	<ul style="list-style-type: none"> Replace the lamp. Contact your technical assistance service.

13 REMOVAL FROM INSTALLATION SITE

The machine can be disassembled in order to move it from one site to another or in order to be scrapped.

Transport must be carried out in compliance with the norms described in this handbook in the chapter entitled "HANDLING AND INSTALLATION".

13.1 DISASSEMBLY

- In order to disconnect the machine from the mains supply, follow the procedure described for the electrical wiring in reverse.
- Remove the supply cable coming out of the board and place it inside the board itself. In this way the machine can be reassembled and can be started up again.
- Clean the surfaces accurately, oil the parts that could rust and cover the machine so as to protect it from dust, dirt and humidity.

13.2 SCRAPPING

- In order to disconnect the machine from the mains supply, follow the procedure described for the electrical wiring in reverse.
- Discharge all the refrigerant from the refrigerating circuit.
- Remove all the oil from the motors.



WARNING! This product should not be left in the surrounding environment:

- the refrigerating;
- the compressor's unfreezable oil;
- the polyurethane.

It would be advisable to contact specialised companies for the disposal and the recycling of the above materials.

- Divide the remaining parts according to their type and destroy in compliance with the laws in force.
- To remove and transport the machine please refer to the procedure described in the chapter entitled "HANDLING AND INSTALLATION".